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1948 in Retrospect

The closing year has been one of outstanding importance to the foundry industry. It was learnt during the autumn that the threat to nationalise iron and steel industries involved, according to the Minister of Supply, the sequestration of 22 out of 98 steelfoundries and 30 out of 2,100 ironfoundries. Our estimate is that 60 or 70 ironfoundries, not 30, would be involved. Then there was the formation of a liaison committee, which for the first time in history brought about intimate contact between the iron, steel, non-ferrous and light-alloy founders. The year saw the inauguration of a free research service for all ironfounders; the first really international congress of vitreous enamellers; the publishing of the details of the nature and properties of nodular cast iron, and the holding in London of a record national convention by the Institute of British Foundrymen.

Technical Activities

The Institute of British Foundrymen is making astonishing progress. It has now well over 4,000 members spread all over the world. In Mr. R. B. Templeton, the Institute has found an orator of no mean calibre, an enthusiast for progress in foundry matters, and a first-rate propagandist. He presided with real distinction over a brilliant convention of record proportions held last June in London. He and his colleagues, however, have so far failed to find a solution to the problem as to how to house an ever-increasing number of members participating in conventions when these are held in the normal foundry centres. Until our provincial cities possess much greater hotel accommodation than now exists, we are afraid this problem will remain unsolved. With a few brilliant exceptions, the general level of Papers submitted—like those of the rest of the world—has fallen off somewhat. We are unable to explain this, except that the real worth of technical contributions does seem to move in cycles, and this augurs well for the near future.

Research

The British Cast Iron Research Association has this year been thoroughly reorganised consequent upon the new basis which has been established for its financial structure. It has now disclosed the nature of its invention of nodular cast iron and progress has now entered the domain of trials in the various works; the industry awaits with interest the final phase of large-scale production. The Association, under the new conditions, will be in contact more closely than ever before with ironfounding in all its branches. It has magnificent resources, now freely available to all ironfounders seeking aid. With the passage of time, the British Non-ferrous Metals Research Association is giving an ever-increasing attention to the requirements of the foundry industry, and the sole favour we ask is the reduction of time elapsing between the finish of a research and its presentation to essentially foundry audiences. The British Iron and Steel Research Association have a special department for aiding steelfoundry practice and have contributed in no small measure to the success of the use of oxygen in steelmaking processes.

Ironfounding

During the first six months of this year production was running at a record figure, representing an annual production of the order of 3,320,000 tons. During the third quarter, however, there was a distinct recession and the output fell by 7.12 per cent., which lowers the annual rate to 3,110,000 tons. The sections most adversely affected were those making castings for the Coal Board (13.5 per cent.), marine

(*Continued overleaf.*)

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1948 *in Retrospect*

engines (12 per cent.), and agricultural implements (10.9 per cent.). At the other end of the scale were jobbing (7 per cent.), automobile (5.72 per cent.) and pipes (5.65 per cent.). The latest employment figures relating to the beginning of September showed a decrease of about a hundred as compared with those a month earlier. Despite this recession, the demand for heavy castings is as insistent as ever; there is as yet no real evidence of slackness anywhere, except in one case where the shortage of steel components has shut down temporarily the mechanised section of the ironfounding department attached to a large engineering works.

The Council of Ironfoundry Associations has so consolidated its position in iron circles that it is now difficult to imagine how the industry could operate without it. Our advocacy for the creation of such a body, extending over two decades, has at last borne abundant fruit. During the year, through the Joint Iron Council, a system of subsidising research, technology and education through a levy on pig-iron, has been established. The applications for licences for buildings and plant extensions have been handled to the general satisfaction of the industry. The appointment of Mr. Kenneth Marshall, as director, led, *grace à Dieu,* to the establishment of a continuous policy, instead of a "plan," for the future well-being of the industry. His was indeed a really worth-while effort and a diplomatic achievement. It is with regret that we learn of the impending resignation of the founder and president of the C.F.A., Mr. FitzHerbert Wright. He has, through his dynamic personality, built up an organisation which will for ever be a testimonial to his foresight.

Steelfounding

It is particularly pleasing to see the steady progress being maintained by the steelfounders. Easily-assimilated figures, which illustrate this, can take the form of average weekly productions. Throughout 1947 the output averaged 3,600 tons; for the first ten months of this year 4,100 tons and during last October 4,700 tons per week. If the 10 months' average is maintained it will mean that an increase of over 20 per cent. in production has been achieved, and no doubt when the final figures are available they will show a record output for peacetime operation. The British Steel Founders' Association has made steady progress under the presidency of Mr. F. A. Martin. He and a number of his colleagues have been experimenting on the use of oxygen as an enrichment to the blast of Tropenas converters. Real success has attended this development, and once again Britain is leading the world in a useful metallurgical discovery and application. Throughout the year, steelfounders have been worried as to whether or not they would be taken over by the State. The schedule given by the Minister of Supply shows that out of 98, no fewer than 22 are to be nationalised. In the future they will be worried about the placing of orders by the State Railways, the Coal Board, the Electricity Board with the publicly-owned steelfoundries in preference to those operated by private enterprise. It is not too happy a prospect, especially as a serious percentage of the over-all business emanates from the already nationalised industries.

Non-ferrous Founding

The Association of Bronze and Brass Founders have had a particularly busy year. Under the enlightened presidency of Mr. F. G. Burrell, the Association has had to worry about the supply of its raw materials, most of which become available only through the Ministry of Supply. Their continuous appeals for freer trading have so far been ignored, though there is some hope of the reopening of the London Metal Exchange in the future. Other subjects coming under consideration were recruitment and training; conditions of sale, and the quality of crucibles. This Association rightly attaches much importance to its technical activities, and the services rendered to members in this respect are outstanding. During the year, trading conditions have been patchy, and here and there it has been found difficult to maintain full employment. Already sales are being made at uneconomic prices, through the use of "gipsy-ed up" scrap, yielding a product unworthy of the industry. Current conditions are such that even the smallest founder can produce and sell castings to a guaranteed specification.

Light-alloy Founding

The newest section of our industry, that of light-alloy founding, is about 40 years old. During the war, the makers of these castings saw the need of an employers' organisation and the Light Metal Founders' Association was formed. The chairman, Mr. A. H. Sturdee, M.B.E., is conscious of this relative newness and, through a development committee, is constantly stressing the need for finding new outlets for the productions. Nor has he been unsuccessful, for a Paper read by Dr. West before the annual meeting of the Institute of British Foundrymen disclosed a number of new lines which show every promise of permanency. During the year there have been a number of cases where light alloys have

replaced iron castings, but it is doubtful whether these will be permanent owing to the likelihood of the impact of the price margin under normal conditions; some will, however, be retained. The major problem is not with the expansion of the aluminium section, which is producing at the rate of about 50,000 tons of castings a year, but rather with the magnesium group. Here the annual output is of the order of 3,300 tons. Real difficulty has been experienced in maintaining a steady load for the specialised foundries, which still have to rely to a large extent on the aircraft industry. It is not generally realised that the current output of aluminium die-castings is now about 66 per cent. greater than the sand-cast production.

Vitreous Enamelling

The new president of the Institute of Vitreous Enamellers, Dr. H. W. Webb, threw something of a bombshell into the legions of supporters of co-operative research, by insisting that the most striking benefits came from the laboratories attached to the large-scale industrial enterprises. He presided over the international gathering held during the autumn. Because it is not a very large industry and but few countries can successfully operate a technical institute, we see no reason why the vitreous enamellers of Europe should not join its ranks. By the widening of the geographical boundries, the value of the Institute to the individual member will likewise expand. The implementation of a policy of periodic overseas meetings would reinforce the undoubted usefulness of the Institute.

Foundry Equipment

The Foundry Trades' Equipment and Supplies Association have had a particularly busy year. In pre-war days, the founding equipment section probably undertook more importing than exporting. To-day, the picture is quite changed and of an output expected to total £3,300,000, machinery to the value of about £800,000 has this year been exported. The Council has been studying methods for improving the efficiency of their works; of establishing standardised sales conditions, and, especially, the better organisation of the "supply" or "materials" section. From the Council, a new committee has been formed with a view to strengthening membership and to taking unified action as to date of alteration when the Government departments announce changes in the prices of raw materials. We hope the supply firms will rally round the new committee. Mr. T. A. Hammersley, the new president, is enthusiastically supporting the new project and will personally help with its organisation.

Book Review

German Foundry Practice—Interrogation of Dr. Lanzendorfer, being B.I.O.S. Final Report No. 1,802. Published by H.M. Stationery Office, Kingsway, London, W.C.2. Price 2s.

This report is divided into five sections:—German Cupola Practice; German Converter Practice; German Foundry Practice, and Comments on British Foundry Practice. So far as cupola practice is concerned, little can be gained at the moment in studying a process based on a 4 to 1 iron:coke ratio. Of course, if coke quality does deteriorate in the future, it might become a handy reference.

The reviewer fails to appreciate that the one example taken of German side blown converter practice is typical of the whole of that section of the foundry industry, yet the case detailed is specially interesting inasmuch as 5 per cent. oxygen is referred to. It is reported that basic-lined cupolas failed to yield a sufficiently fluid metal.

The section on electric furnaces has interest, for the use of the Soderburg electrode is considered and roundly condemned, though disadvantage No. 3 is difficult to understand. It is stated that "they overheated near the roof and at joints." The general understanding of Soderburg electrodes is that they are jointless. The electrode consumption of the graphite variety is given as 15 lb. per ton; this is 50 per cent. higher than the best British practice. The reviewer would like to know the source of 22 per cent. skull scrap used in carbon steel charges—especially as the other components were 13 per cent. scrap in pellet form (obtained by pouring "over metal" into water); 52 per cent. headers and 13 per cent. runners and risers. An interesting feature of the methods detailed is the preheating of alloy additions to 900 to 1,000 deg. C. and the use of calcined lime. This is done to reduce the liability of the introduction of hydrogen.

The only note of moment in connection with German foundry practice is that the weight ratio of runners and risers to the fettled castings is 45:55.

The section devoted to Dr. Lanzendorfer's comments on British steel-founding practice suffers from over compression. For instance, it is difficult to visualise exactly what is meant by the non-existence in the United Kingdom of "a highly developed automatic casting machine." Has he in mind something of the type used by the Stanton Gate Foundry for bomb production during the war? It would be interesting to learn the number of foundries visited in this country, for they do vary very considerably in equipment and methods.

V. C. F.

MR. W. G. THORNTON, managing director of the Yorkshire Repetition Castings, Limited, Bradford, Yorkshire, was elected President of the West Riding Ironfounders' Association at their annual general meeting, held at the Midland Hotel, on December 15. Mr. Thornton is a Past-President of the West Riding of Yorkshire Branch of the Institute of British Foundrymen.

A Note on Core Grids

By "Tramp"

Cast-iron grids or grates are used extensively in many cores to strengthen them, and their manufacture often demands considerable forethought, especially when the cores are surrounded with metal, which, on contracting, may be fractured if too great a resistance is offered by the core. To accommodate this shrinkage a weak place can be made on the grid so as to fracture when the stress on the core due to the contraction of the metal increases. Alternatively, the grid may be made smaller than necessary to permit of a strand or two of straw rope or hay band around it, which chars when the core is dried and thus yields to the contracting metal.

Many core grids are spoiled because they are cast with unsuitable metal. Moulds are made in open sand; the metal should be hot and very fluid, especially when the grid to be cast is of large surface area. Metal which is dull, or of unsuitable analysis—such as the short-freezing-range high-duty irons—often produces grids with considerable excess thickness in places and with a large amount of flash, which has to be ground off to allow the grid to enter the core-box. Further trouble is then caused in the fettling shop in trying to break such grids to facilitate their removal from the casting.

More Long-service Awards

Nearly one thousand years' service were represented by thirty-nine employees of the "600" Group of Companies (engineers, manufacturers and merchants of industrial equipment and machinery), when they received long service awards for 25 years' service or over at a recent ceremony at the Clarendon Hotel, Hammersmith, London. They were presented with either a radio set or a suitably inscribed watch. Since the custom of commemorating long service in this way was begun, 185 presentations have been made, and to-day there are actually 140 people who have been with the "600" Group for over a quarter of a century.

Congratulations

The many friends of Mr. John Bell, of Glasgow, will learn with pleasure and admiration the fact that the December meeting of the Scottish Branch of the Institute of British Foundrymen coincided with the 25th anniversary of his election as honorary secretary, and, moreover, during the period Mr. Bell has not missed being present at either a general or council meeting of the Branch. We congratulate Mr. Bell on his unique record.

THE JOINT IRON COUNCIL, the COUNCIL OF IRON-FOUNDRY ASSOCIATIONS, the COUNCIL OF IRON PRODUCERS, the FOUNDRY PIG IRON PRODUCERS' ASSOCIATION and the CAST IRON PIPE ASSOCIATION have acquired much improved office accommodation at Crusader House, 14, Pall Mall, London, S.W.1. The change from Derbyshire House takes place as from January 1. The new telephone number is Whitehall 7941.

Forthcoming Events

(Secretaries are invited to send in notices of meetings, etc., for inclusion in this column.)

JANUARY 3.

Institution of Production Engineers.

Yorkshire Section:—"Production Management Problems," by M. Seaman, M.Sc., at the Hotel Metropole, Leeds.

Wakefield Association of Engineers.

"Deep Sea Salvage," by D. Miller, O.B.E., at the Stafford Hotel, Bull Ring, Wakefield, at 7.15 p.m.

JANUARY 5.

Institute of British Foundrymen.

Birmingham Branch:—Meeting at the Chamber of Commerce, 95, New Street, Birmingham. Details to be announced by the Secretary.

Institutions of Production Engineers

Nottingham Section:—"Balancing Production," at the Victoria Station Hotel, Nottingham, at 7 p.m.

JANUARY 6.

Institute of Vitreous Enamellers

Midlands Section:—"Application of the Enamel," by Mr. Croxton, at the Chamber of Commerce, 95, New Street, Birmingham, at 7.15 p.m.

Leeds Metallurgical Society

"Non-destructive Testing," by E. J. Vaughan, M.Sc., at the Chemistry Dept., the University, Leeds, at 7 p.m.

The Institute of Metals.

Birmingham Local Section:—"Metals in Instruments," by E. H. Bucknall, M.Sc., at the James Watt Memorial Institute, Great Charles Street, Birmingham, at 6.30 p.m.

JANUARY 7.

Institution of Production Engineers.

Manchester Graduate Section:—"Preventive Maintenance of Machine Tools," by F. H. Ward, at the College of Technology, Manchester, at 7.15 p.m.

JANUARY 8.

Institute of British Foundrymen.

Newcastle Branch:—"Branch-President's Night," at the Neville Hall, Newcastle-upon-Tyne, at 6 p.m.

West Riding of Yorkshire Branch:—Prize-winning Paper in the S. W. Wise Memorial Competition, at the Technical College, Bradford, at 6.30 p.m.

MR. S. T. OWEN, acting Secretary of the Wolverhampton Committee for the Recruitment of Young Workers in the Foundry Industry, hopes to hold an exhibition and some film shows in March to which school leavers and their parents will be invited.

MR. WILLIAM SCOTT, O.B.E., J.P., is to-day sailing in the Capetown Castle for South Africa. Mr. Scott is managing director of Jarrow Metal Industries, Limited. He is a prominent member of the Institute of British Foundrymen and hopes, during his visit, to meet many of the South African members.

RECENT VISITORS to this office from Australia were Mr. F. M. J. Gaussen, of Lysaght (Australia), Limited, and Mr. H. S. Cerutty, a consulting engineer. Mr. Gaussen, who has been a member of the London Branch of the Institute of British Foundrymen since 1935, was loaned by his Government to India during the war to supervise the construction and operation of new plant for the production of munitions. Mr. Cerutty has many interests. He was a pioneer in the introduction of the electric furnace for making steel castings in the Southern hemisphere. Many years ago, more or less accidentally, he became a lecturer in metallurgy at the Sydney Technical College. He still continues to hold this office, as it is one method of keeping his technical knowledge up to date. His other interests include the mining of mica.

Foundry Drying Systems*

Comprehensive and Practical Survey of Stoves and their Relative Efficiencies

By John B. Morton†

The aim of this Paper is to review the application of heat and the plant required in the preparation of the materials to form castings which are sound and suitable for engineering. The items of equipment required depend, of course, on the type of foundry and the class of its particular products, but it can be assumed that drying plant is utilised to some degree in most foundries.

The designs, types and methods of drying equipment are many and varied, but can be classified under four main headings:—(1) Core-sand drying; (2) core drying; (3) mould drying, and (4) ladle drying. First, although it is not necessary to dry rock sand before mixing, for oil-sand coremaking it is advisable to dry and cool sea sand for the correct control of moisture contents and its satisfactory mixing with core binders. Second, the drying, or, more correctly, the baking of cores, is advisable to increase their dry strength against handling and casting stresses, to increase the permeability for quick and free passage of mould gases and for reducing the tendency for gas-forming material such as moisture and the volatile constituents of the core binders to gasify the molten metal if released into the mould. Third, mould drying, although not always necessary, is made use of by most foundries, both ferrous and non-ferrous, at some time or other, even if it is only flame drying. For large iron, steel or brass castings, dried moulds are necessary to withstand the casting pressures and high-temperature erosion. The actual demarkation line between dry sand and green sand can only be ascertained by the type of work, metal, and in the light of experience. Fourth, the refractory lining of casting ladles must be dried properly to prevent evolution of gas and to maintain the metal temperature. Ladle driers, although very necessary, are usually neglected items of equipment and in many cases makeshift, inefficient, fuel-extravagant fires are used.

Core-sand Drying

In small foundries where large quantities of dried sand are not required, it is usually adequate to dry sufficient by spreading the wet sand on the top of drying stoves or by throwing hot metal heads and risers, etc., into bins of wet sand at the conclusion of casting. In fact, long storage of the sand in bunkers usually dries it sufficiently through exposure. In larger mechanised, or partially mechanised, foundries it is quite a different matter and sand driers are recommended for this operation.

Sea sand, on arrival at the works, depending on weather conditions, is often wet and soggy. In fact, with Britain's climate, it usually is, but much of the excess moisture can be drained off by proper storage. It has been proved that a moisture content of about 10 per cent. can be reduced to 6 per cent. and less in the course of about two weeks by storing the wet sand in a brick bunker of large area, but shallow depth, *e.g.*, 6 ft. The bottom of the bin should be laid with dry unjointed bricks set on a 6-in. bed of ashes, with gutters leading from this to the common drainage system.

In the foundry with which the Author is associated, a static type of drier is in use. Originally, as purchased, it was shaped as shown in Fig. 1 (*b*), the hopper surrounding the inclined roof of the firebox was filled to capacity with wet sand, which, on drying against the sloping roof, was supposed to filter down through a ¼-in. gap at the bottom. Needless to say, it was quite useless as a drier. Because of the poor heat conductivity of sand and the lack of air circulation, steam formed in the inner layer immediately condensed in the colder adjoining layers, resulting in the drier becoming jammed up at the bottom with soaking wet sand. Furthermore, the 45 deg. angle plates over the firebox buckled with the uneven heat and distorted the outlet gap.

As shown in Fig. 1 (*a*), the drier was taken apart and rebuilt, the sloping heating surfaces being partitioned off with welded-on steel strips, spaced slats between the divisions restricting the sand depth to about 2 in. This had the result of increasing the heat-conducting surfaces in contact with sand and of allowing the steam to escape through windows cut in the sides of the drier. The top of the drier was built up with a smaller hopper

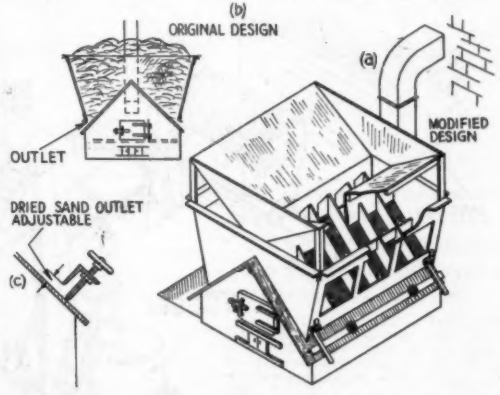

FIG. 1.—STATIC SAND DRIER, (*a*) MODIFIED DESIGN, (*b*) ORIGINAL DESIGN, AND (*c*) ADJUSTABLE OUTLET.

*A Paper read before the Scottish Branch of the Institute of British Foundrymen.

†This Paper gained for the Author the award of the John Surtees Gold Medal.

Foundry Drying Systems

which sloped into the apex of the drying roof, this hopper was periodically filled by grab-bucket from the sand bin. The outlet was formed by a hinged angle, the gap of which was adjustable by two hand-wheels (Fig. 1 (*c*)). This angle could be lifted to free the outlet from grass and other *débris* to be found in sea sand. The dried sand was arranged to fall into a pit and *via* an elevator was conveyed to a hopper above the sand mixer. To counteract the tendency of the sloping plates to buckling, an angle frame was welded on the inner surface. Bent moulders' brads were welded at staggered intervals inside this frame to retain a refractory cement lining which was plastered over them to form a thin refractory roof.

Although the performance of this drier was increased to a far greater extent, it still was not fast enough for requirements and was extravagant with coke fuel, so the installation of a rotary drier was contemplated.

Rotary Sand Driers

Rotary mechanical driers, either horizontal or vertical, are efficient in the respect that the sand is always being turned over and over and moisture is allowed to freely escape as vapour. Various designs are on the market, using coal, coke, coal gas, producer gas, or oil, as fuel. While it is agreed that the gas and oil group of fuels is cleaner and more easily controlled, low coal-gas pressure in some districts prohibits the use of town's gas. It is also debatable, with oil firing, as to the possibility of unburned particles of the fuel contaminating the sand and becoming combustible, with formation of gas, only at casting temperatures.

The installation of a rotary drier requires thought, not only for its capacity, fuel required and cost, but as to the method for feeding it with wet sand and the conveying of the dried sand to the mixer. If these operations are carried out manually, then extra labour is required, in these days of shortage, for a tedious and dusty job. The cooling of the sand is another factor to be considered, for hot sand, when mixed with binders and water, is apt to cause premature drying, sticking in the coreboxes, and increase of ultimate core-drying time.

Fig. 2 depicts diagrammatically how these factors are being contemplated in one foundry. Wet sand, which has had some of its moisture drained off in the bunker, is loaded into a hopper with a crane grab. A belt under the hopper conveys the sand to the worm feed inlet of the rotary drier. The dried sand falls out of the other end of the drier into the boot of a bucket elevator. It is elevated and cascaded down a slatted cooling chute into a storage hopper. The back of the slatted chute is connected to the outlet flue from the drier at a venturi which creates a suction and so draws cold air through the cascading sand. Hot air from the firebox is passed through an internal tube in the drier almost to the inlet end, where it circulates back into the outlet flue. An exhaust fan connected through the wall to an outside dust cyclone is considered necessary to reduce the escape into the shop of fumes and dust from the drier.

Core and Mould Drying

In the jobbing foundry, many cores are made with high-green-strength sand and dried with the mould. This is especially the case in heavy founding, but by far the majority of cores for general work are dried and baked prior to assembling in the mould. As casting design and foundry mechanisation advance, cores become more numerous and more intricate. Machine moulding demands patterns designed to suit, involving the need for block cores to replace multi-part moulding boxes, drawbacks and uneven pattern joints, *etc.* This leads to a desire for increase in core production and for fast drying and baking.

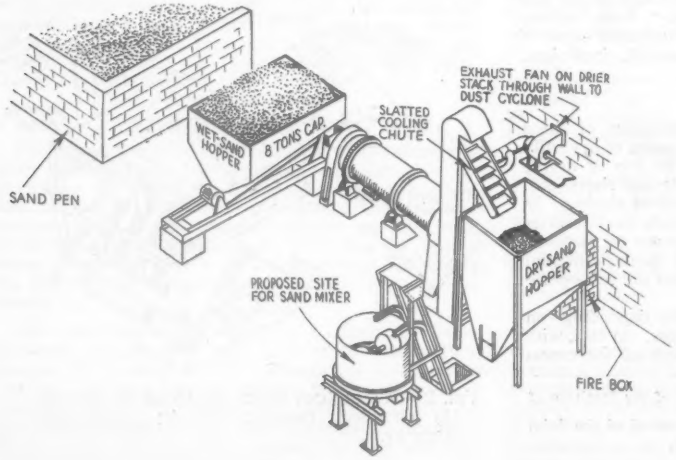

FIG. 2.—PROPOSED LAYOUT FOR SAND-DRYING PLANT INCORPORATING A ROTARY DRIER.

The baking rate is influenced by the ingredients of the sand mixture such as moisture content and type of bond, the size of core, and the time and temperature control of the drying oven. The first action of heat on cores placed in drying ovens is to drive off the moisture, after which the volatile constituents of the core binder, especially when oil is used, are distilled off. Finally, the baking of the binder proceeds by chemical reaction with oxygen to form a tough adhering skin around the sand grains. To fulfil these conditions, heat in the form of hot gases must be circulated at an even temperature throughout the drying and baking, at sufficient speed to drive off the moisture and containing sufficient air to provide oxygen for oxidation. This applies also to mould drying where, however, it is mainly moisture which has to be driven off. In this case, if the heat be too great, the combined moisture in the clay* and sand bond is driven off, resulting in a burnt mould.

Principles of Drying

One fundamental factor in the drying of granular material has to be given special attention whenever heat is applied to a sand face. Water-vapour formed at the sand face spreads in all directions and consequently some of it condenses in the cooler sand behind the surface. An example of this can be seen in the ordinary practice of toasting a piece of bread. Everyone must be familiar with the phenomenon of the bread becoming very moist at the back where the water-vapour generated at the face is condensed. The amount of water-vapour spreading into a core or mould is therefore governed by the speed at which it can be driven off at the surface.

*The dehydration of clay would demand a higher temperature than that normally encountered in drying.—EDITOR.

Firing Systems

In early forms of stoves (Fig. 3 (*a*)) heating was applied as in boiler firing, that is, combustion was effected to give a high percentage of CO_2—of the order of 12 to 14 per cent. All the air was introduced by chimney suction as primary air, which passed underneath the fire and through the firebars. This resulted in a small volume of high-temperature gases entering the stove chamber and caused overheating of any object near the source; many instances of melted moulding boxes were known. The combustion was, in fact, similar to that of a reverberatory furnace. Therefore, the ratio of the volume of the gas from the firebox to the volume of the stove, as represented by the time taken to change the atmosphere of the stove, was many times greater than is considered good practice to-day. Proceeding through the stove at this slow rate, the gases cooled considerably as they moved towards the outlet flue; this resulted in a very steep temperature gradient. To overcome variations in chimney draught due to weather conditions (and also where high stacks were structurally impossible), fans were added to blow the fire. The immediate affect of that was to promote combustion to a higher intensity and to aggravate the risk of damage to the stove and its contents.

Auxiliary Forced-draught System

The next stage in the development of ovens (Fig. 3 (*b*)) was to cool, but increase the volume of, the gases from the firebox, by the introduction of secondary air over the fire, which diluted the products of combustion and picked up heat from the firebox roof with benefit to the refractories. In common practice, this secondary air was twice the volume of the primary and the CO_2 content in the stove was about 6 per cent. There was however, an inherent inefficiency in this type—the high

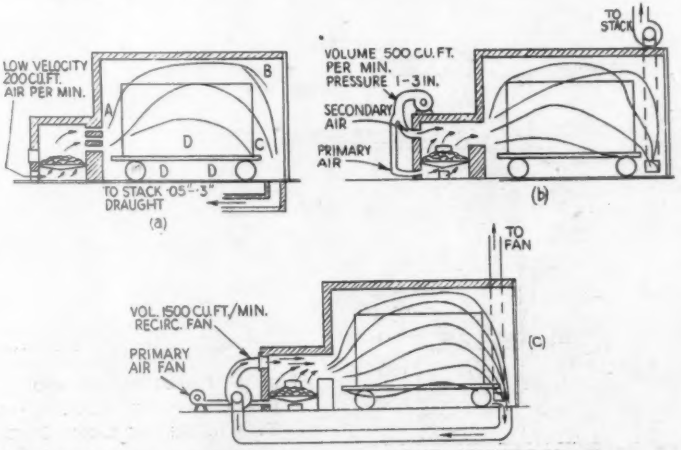

FIG. 3.—FIRING SYSTEMS FOR STATIC CORE AND MOULD STOVES, (*a*) EARLY TYPE, (*b*) AUXILIARY-AIR AND FORCED-DRAUGHT TYPE, AND (*c*) RE-CIRCULATION TYPE.

A—High Temperature, Low Volume Gases entering Stove at 1,000 deg. F.; B—Temperature drop to 550 deg. F.; C—Temperature drop to 350 deg. F.; D—Moisture-laden, Cold Gases at 250 deg. F.).

Foundry Drying Systems

heat loss in the larger volume of the flue gases. For example, if three times the amount of air were introduced into the system in comparison with the earlier type and under both systems the gases left the drying chamber at, say, 500 deg. F., the stack loss would be three times as great as in the natural-draught type. On the other hand, the uniformity of drying was so vastly superior as to render the earlier system obsolete! An example of this type is shown in Fig. 4 (*a*) which depicts a stoker-fed firebox with secondary air blown under the roof arch at 500 cub. ft. per min., 3-in. w.g., and diluting the products of combustion of a coal shingles fire burning at an average rate of 1¼ cwts. per hr. The primary-air tuyeres are, of course, incorporated in the stoker retort unit. This firebox serves a battery of five core stoves, 10 ft. by 8 ft. by 8 ft. each, maintaining a temperature range of 300 to 500 deg. F. (150 to 255 deg. C.), with an average CO_2 content of 4 to 6 per cent. The temperature in the various chambers is controlled by the opening or closing of the inlet flue according to the size of cores being dried. The end compartment furthest from the firebox is maintained at a low temperature for the drying of blackwash on the bigger cores. The average drying time is governed by size and number of cores loaded, but averages 3 to 6 hrs. Fig. 4 (*b*) shows diagrammatically a coke-fired box serving two bogie mould stoves of 10-ft. by 8-ft. by 8-ft. capacity each. The rate of burning is in the region of ½ to ¾ cwt. of coke nuts per hr., whilst the products of combustion are diluted by two-thirds their volume of air at 500 cub. ft. per min., the remaining air passing through the fire as the primary supply. The stove maintains an even temperature of 400 to 600 deg. F. (205 to 315 deg. C.), according to the size and number of moulds loaded. This firebox is metal encased and was originally used as a portable drier for large pit moulds.

Forced-draught Re-circulation System (Fig. 3 (*c*))

It became apparent that if the flow of gases from a firebox, arranged for a high percentage of CO_2, could be speeded-up throughout the stove, the greatest objection to this form of combustion could be removed and the high heat losses to the stack could be greatly reduced. This involves a reduction in the amount of secondary cold air to be replaced by a supply of gases which have already passed through the stove and added to the products of combustion (thus diluting them) and which finally leave the firebox at the same or greater velocity than the auxiliary-air system. The amount of gas in the system finally leaving *via* the stack is only that amount required in the combustion of the fuel. This system permits a circulation of very large volumes of gas inside the stove without the introduction of any extraneous air.

A few years ago foundrymen looked askance at the proposition of circulation of moist gases amongst moulds and cores, believing that they could not dry cores or moulds in such an atmosphere. Since practically all foundry drying is conducted at over 212 deg. F. (100 deg. C.), this was obviously a fallacy since, by reference to steam tables, the saturation point is infinity at such temperatures. In fact, it would be reasonable to dry moulds in superheated steam which exists as a gas at such temperatures. It is therefore possible with re-circulation stoves to run more efficiently at a CO_2 figure of about 9 per cent., which is considerably higher than those in the forced-draught auxiliary-air type of fireboxes.

An example of how re-circulation was introduced into an existing firebox is shown diagrammatically in Fig. 4 (*c*). Although not theoretically correct due to struc-

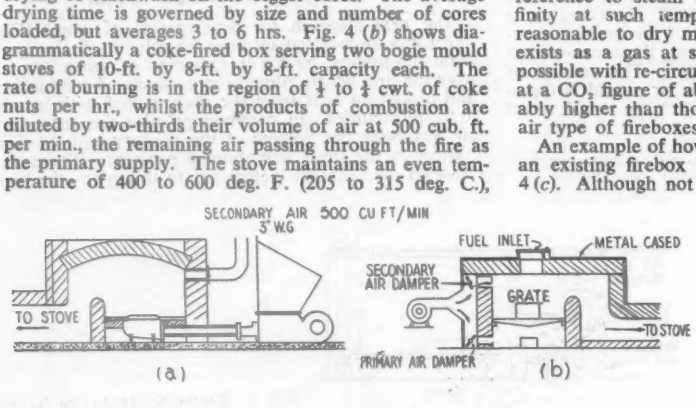

FIG. 4.—FIREBOXES, (*a*) AND (*b*) FORCED-DRAUGHT, AUXILIARY-AIR TYPE, (*c*) RE-CIRCULATION TYPE.

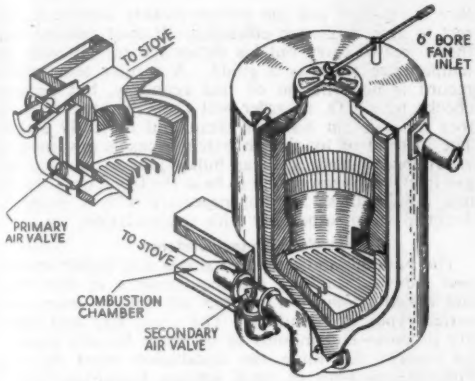

FIG. 5.—DRY PRODUCER TYPE FIREBOX.

tural difficulty, it increased the efficiency of the stove. This firebox serves two mould drying stoves of a combined capacity of 2.520 cub. ft. and burns coal shingles at the rate of ¼ cwt. per hr. The re-circulation fan has a capacity of 1,500 cub. ft. per min.; therefore, with the volume of gases from the products of combustion, about three times the volume of gases is passed over the moulds as compared with the cold auxiliary-air system using a similar size of stoker. In this case the connection for the re-circulation was taken off the base of the outlet flue and passed through the fan into a cast-iron nozzle shaped so as to increase velocity and create a local depression to increase the speed of the products of combustion at the stoker fire.

The factor of 4 ft. for the natural length of flame in a re-circulation firebox design should be observed where coal is used as fuel, as in the case of worm stokers. If the flame is met by the moist re-circulation gases before it has completed full combustion of the tarry volatile particles at the tips of the flame, there is a tendency for these tips to be snuffed out and to cause a smoky, sooty, flame due to incomplete combustion.

Dry Producer System (Fig. 5)

This was an intermediate development between the auxiliary air and re-circulation systems and was designed to operate at higher CO_2 figures (9 to 10 per cent.) and therefore at lower flue losses than the auxiliary-air type. The cylindrical firebox was built up of an inner sheet-metal casing, refractory brick lined, and contained the firegrate, which was connected through the outer casing above and below the firebox for a fettling door and ash door respectively. The outlet port to the combustion chamber led out at a determined position above the level of the primary combustion zone. The outer casing of sheet metal surrounded and sealed off the inner casing. The fuel inlet opening was formed by the cast-iron top of the inner chamber; the top surface of the opening and the face of the cast-iron lid was machined to form a gas-tight seal. Air from a 6-in. bore fan delivering 500 cub. ft. per min. was blown tangentially through the outer casing; it circulated round the inner chamber, collected heat from it, and then passed out at the bottom, where it was divided up, approximately one-third going to the primary-air inlet below the grate and the remainder through the secondary-air nozzle into the combustion box.

Method of Operation

After the fire has been well kindled, the box is filled to the top with coke nuts, the lid is replaced and the joint sealed with ganister. Blast is then turned on, and the following well-known reaction takes place:—

$$C + O_2 = CO_2$$
$$CO_2 + C = 2CO$$

The CO passes out into the combustion chamber for combustion with the secondary air to form carbon dioxide. The turbulence of the combustion and the speed of the secondary air from the jet-action nozzle sends the gases into the stove at high velocity. A further advantage of this type of unit is that it takes up little room and eliminates the constant charging of fuel. Coke nuts are fed from an overhead hopper, as shown in Fig. 6. This hopper is charged with a skip which

FIG. 6.—COKE HOPPER FOR FEEDING THE DRY-PRODUCER FIREBOX.

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is tipped over the bars at the top. A disadvantage is that the producer must be gas-tight for its full efficiency to be realised. Units of this type, with capacities of 10 cwts., serve the large pit stoves shown in Fig. 7 (and Fig. 16), and burn coke at the rate of 94 lb. per hr., drying the contents of the stoves in 36 hrs. at a temperature of 600 to 700 deg. F. (315 to 370 deg. C.).

Units of similar capacity also serve the loam core stoves, as shown in Fig. 8. The outlet flues of four large pit stoves, four loam-core stoves and two small core stoves are all connected up into one large common flue which leads to a tall stack. The settings of the combustion valves and the outlet flues of all these stoves are carefully controlled by one man, who also controls the loading of them to obtain the maximum efficiency.

It is quite feasible, and would most probably be an advantage, to introduce re-circulation into the dry-producer firebox system. This could be carried out by fitting a large-capacity water-cooled-bearing re-circulation fan with the inlet connected to the stove exhaust flue and by altering the secondary nozzle in the combustion chamber to suit.

Drying Stove Control

Drying procedure, like stove design, is entirely dependent on the products which have to be dried or baked. The chief factors to be considered are as follow:—(1) fuel economy; (2) temperature; (3) speed of drying, and (4) method of loading. All these factors overlap each other towards the main aim of efficiency.

It is advisable to have chart temperature-recording instruments on all stoves, which enable a careful check to be made throughout the process. In gas-, oil- or stoker-fired units, this recording instrument incorporated with an automatic thermostatic control is a great advantage. However, in hand-fired units, the control of temperature, rate of drying and fuel economy has to be determined by trial and error settings of combustion, stove inlet and outlet flues until the desired temperature is attained and the carbon-dioxide content is correct to give maximum efficiency. It then remains with the stoker to carry out his duties accordingly with the temperature chart as a guide. A regular temperature record is no criterion of fuel economy, but periodic checks by a CO_2 recorder will keep the stoker on his toes to maintain his fires clean and correctly stoked. The method of loading in batch ovens is governed by experience, points, such as bulky jobs to be near the gas inlet and lighter work to be at the front, need watching, though these are not necessary with a properly-designed stove, especially with re-circulation.

Core-drying Systems

The building and design of stoves is a highly specialised industry fulfilling the requirements of the many and varied production systems of just as many and varied types of foundries. The class, size and quantity of cores and moulds to be made by any particular foundry determine the installation most suitable. For the coreshops of small jobbing foundries, cabinet types of stove with pull-out drawer, swivel drawer, or fixed-shelf units can be adequate. In larger and more highly mechanised foundries and for the drying of pasted and blackwashed cores, the drawer types, either pull-out or swivel, can be useful. As this kind of work requires repeated opening of stove, it is advisable to instal drawer types with shut-off backs on the drawers to prevent heat escape. As the structural design of drying units for both moulds and cores are well displayed in advertising literature, it is an object of this Paper to deal with their relative value in the formation of a production system. For the coreshop, the two main systems are batch-type and continuous-type drying installations.

Batch-type Ovens

A typical example of a battery of batch-type ovens is shown in Fig. 9. Racks, robustly constructed of steel angles and tubes, carry the cores on appropriate plates. The racks are conveyed to the stoves by hydraulic lift bogies. This type of conveying requires a smooth and even concrete floor, both in the stove and the core-

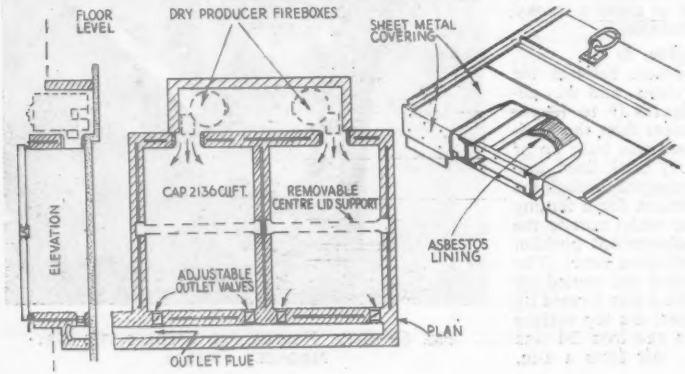


FIG. 7.—TWIN PIT STOVES, PLAN AND ELEVATION, AND SECTION OF COVER.

FIG. 8.—LOAM CORE STOVES.

shop, to prevent undue vibration and subsequent breaking or distortion of the green cores. Where consistent drying of large quantities of different types and sizes of cores is required, this system is very suitable. Cores are loaded according to their respective sizes on the racks and the stove chambers are dampered to suit the different temperature and time ranges. For example, where two racks go into a chamber, the back rack would contain heavy cores and the front rack smaller cores, which would be drawn first. It is not advisable to have ovens more than two racks deep, because of the heat losses and the personal discomfort arising from

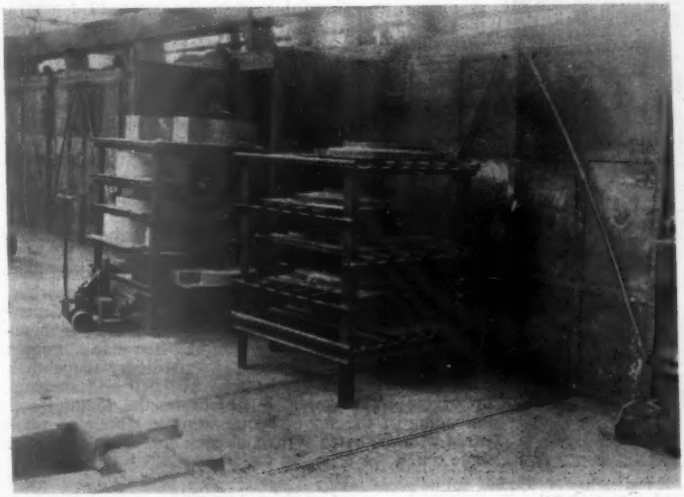


FIG. 9.—BATTERY OF BATCH-TYPE CORE OVENS.

Foundry Drying Systems

excessive fumes in removing the innermost racks.

To eliminate too much handling in the loading of the racks, the coremakers would require to be grouped in sections dealing with the different size-ranges. Empty racks are placed near each group for the direct loading of green cores. It only requires one man for transporting the racks into the oven and for removing the dried racks of cores and unloading them at the pasteing and blackwash benches, the empty plates being left on the rack. One of the fire chambers in the batch is damped down to a low heat for the drying of the pasted and blackwashed cores.

If an ample supply of racks is available, the flexibility of the batch system can assist fuel saving, for drying can be carried out overnight as well as during the daytime and the full use of the stoves may thus be arranged without intermittent periods during which the stoves cool down.

Continuous Drying Stoves

This system is mainly of use where cores are uniform in size and are made in large quantities. Full economy, however, is obtained only when the stove is fully utilised. The two chief types are the horizontal and the vertical. The horizontal method, not too common in this country, is worked in conjunction with a pendulum conveyor. Coremakers, working in line with the pendulum racks, load the cores directly on the conveyor, which travels into the stove, up an incline, round a loop and returns to the inspection, pasteing and blackwashing benches. The incline to a higher level serves to save floor space, as the area beneath the stove can be utilised as storage space for cores, etc. The advantage of this type is that it reduces handling to a minimum and this, coupled with the smoothness of the conveyor travel, reduces core breakage.

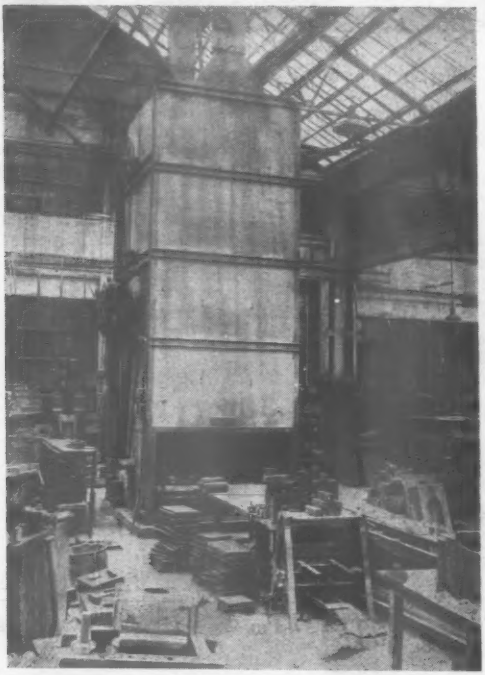


FIG. 10.—VERTICAL CONTINUOUS-TYPE CORE OVEN.

The vertical continuous core oven is now more common and offers the great advantage of saving floor space. Ovens of this type with the lower portion left open all round, the heating zone commencing about 7 or 8 ft. above the floor, enable grouping of the coremakers around them to load their cores directly into the carriers. Where female labour is employed, their close proximity to the heat and the carrying of cores to the stove is not desirable. The usual system is to serve the loading and unloading stations with conveyors. A typical example, as shown in Fig. 10, occupies a floor area of only 80 sq. ft. and extends in height to 21 ft. from floor level with about 3-ft. clearance under the floor. Cores are carried on pendulum multiple-tray carriers, which are supported at each end by continuous chains driven by large-diameter sprocket wheels. They are hand-fired with coke (the firebox is situated just above the loading station). The heat travels upwards with the cores through a double-flue stack at the top. This method of heat travel counteracts the tendency towards shock heating as the cores enter and leave the heating zone at gradual rate. Careful control, however, of temperature at 450 deg. F. (230 deg. C.) may be maintained with aid of thermocouple pyrometer and chart recorder.

From loading to unloading, the time cycle is 97 min. for drying and baking small to medium cores defined as weighing 12 lb. maximum (cores above this weight would require two cycles). With double-tray racks carrying ten core plates at 11-in. square and five core plates at 18 in. by 12 in., the stove capacity is therefore 270 plates of cores per cycle, or 168 per hr. The coremakers, positioned alongside a steel band conveyor, load their work directly on to this belt, the cores being loaded into the stove by the operator at the end. The dried cores are collected from the "unload" position by another operator and placed on a power-driven conveyor leading to the pasteing and blackwash benches. The production speed of the coreshop is entirely dependent on the stove capacity and speed of drying; therefore, there is no flexibility and more often than not cores are produced faster than the stove will dry them, thus causing overloading of the conveyor belt and slowing-up of the coremakers. Furthermore, the loading and unloading of the stove requires double labour as compared with the batch system, as each coreplate is handled three times.

(To be continued.)

American Foundry Practice

Interest Centres on Equipment, Raw Materials and Sand Systems

At a meeting of the East Midlands Branch of the Institute of British Foundrymen, over which Mr. H. P. Radford presided, Mr. F. W. Nield gave a talk on "American Foundries." What follows is a *résumé* of the discussion.

DISCUSSION

MR. BUCKLAND expressed his interest as to the American preference for steel moulding boxes and in the fact that no mention was made of aluminium slip flasks. It was obvious from a number of the slides shown that such flasks were extensively used. He was surprised that only 29 per cent. of the American foundries used airless shot-blasting equipment, and asked whether the use of this type of cleaning was expanding, and what was the most popular method of cleaning. Also of interest was the fact that 50 per cent. of the foundries had some sort of dust control, and whilst slides showing extraction units were shown, he asked for more details of the methods used.

MR. NIELD, in reply, said aluminium jackets were used in many American foundries, although steel moulding boxes seemed the most popular. He agreed with Mr. Buckland that certain of the slides shown did indicate that a high percentage of aluminium jackets was being used, but that was just a coincidence. Although statistics indicated that only 29 per cent. of American foundries use airless shot-blasting equipment, it should be borne in mind that this figure represented the position at the end of 1945. He felt sure that if up-to-date statistics were available, this figure would be much higher, as many foundries then using tumbling barrels were contemplating installing this type of equipment. Atmospheric conditions in the foundries visited were good. He was not in a position to give fuller details of how the dust was collected after being extracted at the knock-out stations.

MR. MEASURES, referring to sand mixes, said the figures given of moisture, 4.4, being plus or minus 0.4 per cent. or 10 per cent. up or down, seemed a wide variation.

MR. NIELD said he felt that the variation $\pm$ 0.4 per cent. on 4.4 per cent. moisture content for moulding sand on a mechanised plant was reasonable control. On the mechanised sand-conditioning plant of the company with which he was connected, the management were controlling moisture figures within $\pm$ 0.3 per cent. on an average figure of 6.0 per cent., and felt that these results were very satisfactory.

Equipment in America and its Use

MR. C. H. WILSON, referring to the first slide which was shown, said there was no mention of any foundries in Alabama. He pointed out that Alabama had a very large and thriving industry, equal to some of the other States shown. He then posed two questions: (1) were American foundries better served than British in the way of equipment, and was better equipment available to them than to us?; (2) was the equipment applied better there than here? Did they make better use of it than in this country, or did they tend to put in a machine where a man would do? There were cases in this country where a machine was put into the foundry and was improperly used. One should ensure that the machines worked to capacity, and that was where he thought a major weakness existed.

MR. NIELD said the figures of the number of foundries in each State shown on the slide were from a reliable source. The fact that Alabama was omitted from the slide did not indicate that in that State there were no foundries, but only that Alabama had relatively fewer foundries. He felt that, owing to the size of the American foundry industry, the equipment manufacturers had had a better opportunity than their opposite numbers in this country. As to application, this was of major interest. The Americans were a little more production-minded than Europeans. There were mechanised foundries in this country, but in many cases they were not working to full capacity. Everything rested on the people concerned with establishing production speeds.

MR. WILSON said Alabama turns out something like three-quarters of a million tons of grey-iron castings annually.

MR. BUTTERS asked for figures on actual mould production, hourly or daily, taking into consideration the size of the mould. It was somewhat surprising that the roll-over machine predominated. From American illustrations, it would appear that the large mechanised plants used the pin-lift type. Figures giving the number of men, the quantity and size of the moulds, would be helpful.

MR. NIELD said he had no actual production figures, but stressed that they were working the moulding machines to give the maximum possible output. In the mechanised foundries visited that were producing medium-weight castings, the jolt-squeeze-turnover machines were mostly in use.

Comparisons Favourable to Britain

MR. HILL said whilst at the present moment a quantity of statistics and information on American foundries was becoming available, he wondered to what extent British foundrymen were studying development in their own foundries. The average visitor to America would see about thirty foundries in six weeks, whereas he may only have seen about ten foundries in this country in his whole life. He had never been to America, but he had had the opportunity to study many plants in this country, and he had yet to learn of any development in America which was not being used somewhere in this country. He felt with Mr. Nield that the Americans had a superiority in their "production mindedness." Any plant installed, but not worked to full capacity, was not giving a satisfactory return for the capital outlay. Importance should be attached to Mr. Nield's views on

American Foundry Practice—Discussion

heavy-duty roller conveyors. If one spent more money on a better type of plant, it would be beneficial. He thought actual moulding production in America seemed to be somewhat behind that achieved in one or two of the British plants. From information people had brought from America, at the present moment the British approach to plant design would compare favourably with most things the Americans seem to be doing.

MR. NIELD said he thought the American foundry industry had not much to teach us. The outstanding difference was that they were "production-minded." There was nothing new in what he had revealed, nothing that members had not read or seen before. He had refrained from giving a glorified picture of their foundries, but had tried to present statistics of mechanisation and its type.

MR. PAYNE said one subtle innuendo was the remark that Americans were not so interested in the finish as in the soundness of castings, implying that the British may be more concerned with external rather than internal matters. Reclaimed core sand naturally gave a very much rougher finish to castings and, when these were passed on to the customer, he might object to the rough casting even though it be sound, for truly he wanted both soundness and good surface finish.

MR. NIELD said everything revolved round what was meant by soundness and casting surface-finish. The casting surface-finish found in America, although inferior to the standard of British foundries, was not such as to imply that the castings were so rough that there would be an objection from the customer.

Raw Materials

MR. PAYNE said that, in getting a comparison, there was perhaps one point of difference, and that was in connection with the supply of raw materials. In the discussion of the sand-reclamation plant, it was pointed out that sand has to be transported a very considerable distance. Could Mr. Nield give some indication of supply problems in other materials, mainly in connection with grey iron, such as pig-iron and coke? A recent review of the coke position published in the American Press ran along a line that to people in this country seemed very familiar, namely, that coke was not as good as pre-war and, generally speaking, was going to get worse. Had they the same difficulties and prejudices? There was a tendency to imagine that materials were on the shelf and waiting for them. The other point was with regard to the metallurgical control. One gained the impression that the acme of American metallurgy was to break some new record of, say, tensile strength. Was the consistency as high in the States as in this country? Were gadgets and bright ideas more prevalent in America, or was it that they sang about them a little louder, whilst people here were getting on with the next one?

MR. NIELD said that when he was in America, the coke position was serious, as they were suffering from the effects of the coal strike and many foundries were using the last remaining stocks of coke. Normally, the coke position was good, as the coking plants were sufficient to meet the demands of the foundries. The quality of coke, as in this country, was not as good as pre-war. The pig-iron supply position was also affected by the strike, as, of course, without coal there was no coke for the blast furnaces and no pig-iron for the foundries. He thought the position of pig-iron in normal times was good both from the point of view of supply and quality. The position of scrap metal was that it was in very short supply because of shipments of armaments to Europe and the Far East. The metallurgical control in the foundries visited was good.

MR. ROXBURGH said that when one was contemplating the installation of mechanised plant, there were many points to which one could give consideration in striving to get the best lay-out, so as to give the highest production with the minimum of effort and minimum manpower, and at the same time to produce good castings; the mechanised plant had to be proved an economic proposition. The question of controls should be emphasised. When mechanised plant was installed unless one insisted on the proper control of all materials and their use in all operations, the production sought of good castings was not possible. For instance, if the quality of the sand varied, instead of getting 60 moulds per hr., because of the necessity for ramming for a longer period to obtain the required density, production would drop to, say, 50 moulds per hr.

Sand Systems

Mr. Nield had stated that synthetic sand seemed to be universal in the States. Some people used silica sand as a base for the synthetic sand which emanated from the core shop. This silica sand, first used in the core sand, then formed the base for the moulding sand. He was particularly interested to learn that the reclaimed sand was used, in the cases quoted, for cores only. Mr. Nield did not seem to advocate the use of sand via core shop into moulding shop for moulding sand.

Another point was as to whether, in the Author's opinion, hot sand could be used in a mechanised plant to produce good moulds, or whether he insisted that the sand should be cooled. In one illustration a cooling chamber had been shown, but it was not stated how much cooling the sand actually received, and whether it was thought essential to use cool sand. Many plants in this country succeeded with the use of hot sand.

In general, Mr. Nield had stated the casting finish in the foundries in America was inferior to that obtained here. From his personal experience of America and their castings, he (Mr. Roxburgh) felt that technically Britain was leading. He asked whether Mr. Nield was able to gain any further information as to the use of resin for cores, and whether there had been any advances in core-blowing practice and in the various sands which were in use for core blowing.

MR. NIELD said, in reference to core sand, that he was sorry that he did not mention the fact that a small percentage of the sand from the core-sand reclamation scheme was used in the moulding sand in that particular foundry. The question of hot sand was something that many people had experienced on mechanised sand-conditioning plants that had either been overloaded or

(*Concluded on facing page, at foot of Col.* 1.)

House Organs

Edgar Allen News for December. Published by Edgar Allen & Company, Limited, Imperial Steel Works, Sheffield, 9.

This issue details a new development in the application of deposit welding to woodworking machine knives, a subject of major interest to our readers. There is a further contribution from Dr. W. H. Chaloner, who has translated from the French a report made by Marchant de la Houlière on the smelting of iron ore with coke and the casting of naval cannon in Great Britain in the year 1775.

The Nickel Bulletin. Vol. 21, No. 11. Published by the Mond Nickel Company, Limited, Grosvenor House, Park Lane, London, W.1.

A series of nickel-base alloys developed under the trade name of Corrosist, by the Sheepbridge Stokes Centrifugal Castings Company, Limited, at their Sutton-in-Ashfield works, forms the subject of the article "Recent Progress in Corrosion-Resisting Nickel-Base Alloy Castings." In the past, demands for this type of material have been met by nickel-base alloys known as Hastelloy A, B, C and D, imported from America, but to-day two or three foundries in Britain have made considerable progress in this field of production. The Bulletin carries, as usual, extracts of current published information on nickel and its alloys. A copy can be obtained, free of charge, on application to Grosvenor House.

American Foundry Practice

(Continued from facing page.)

under-designed initially. If the sand became very hot, one of the main difficulties was in controlling the moisture addition at the sand mills. The unknown loss of moisture (as steam), which was constantly varying, made moisture control difficult. Many foundries in this country were succeeding with the use of hot moulding sand, particularly if the moulds were cast immediately after being made. For a foundry where the moulds had to stand for a considerable time, there was always the danger if moisture from the hot moulding sand condensed on the cold core surface, for it then might cause a "blow." Regarding the use of resin for cores, he had no information other than what had already been published in the Press, as none of the foundries visited was using this practice.

MR. BUCKLAND said that, referring to matters arising out of the last point, he was in America two or three years ago, and in a number of foundries he visited he, too, found that the surface finish was not considered important. They were not so particular about finish as the British, and in addition they did not appear too particular about the soundness of the castings. He was only referring to malleable practice, but so long as the casting did the job, that appeared to be all that was necessary.

MR. NIELD concurred with Mr. Buckland's remarks on surface finish.

Publications Received

Aluminium Paste. Published by the British Aluminium Company, Limited, Salisbury House, London Wall, London, E.C.2.

Though one sees an ever-increasing use of colour in factories and foundries, the general popularity of aluminium painting is unimpaired. A special book on this subject is particularly welcome at a time when so much thought is being given to the good appearance of workshops. The publication opens after a short introduction by listing the characteristics of aluminium paint and follows with a series of six sections on painting technique. The last three sections cover the storage of paste (from which the paint may be compounded), properties of standard B.A. aluminium paste and its testing. The illustrations have been well chosen and excellently produced. The book is available to our readers on writing to the publicity manager at Salisbury House.

Oxygen: Its Potentialities in Iron and Steel Production. Published by The British Oxygen Company, Limited, Grosvenor House, Park Lane, London, W.1.

Study of this book certainly helps to put the whole question of the use of Oxygen in ferrous melting furnaces into a correct perspective. Emphasis is laid on two cardinal points:—(1) the elimination of nitrogen and the consequent creation of higher temperatures, and (2) the use of impure oxygen as a factor in cost reduction, whilst retaining the advantages of the normally pure gas supplied to industry. Each process is dealt with separately. First comes the open-hearth, and here are discussed the various methods available for achieving commercial results. This is followed by a review of the literature on both the Bessemer and Tropenas processes, where success has followed upon a prolonged experimental stage. Then comes the electric furnace, where apparently fume production is a nuisance, requiring special arrangements for its removal, if shop conditions are to be satisfactory. A fact perhaps never before recorded, is that Stobie carried out large-scale experiments on the possibilities of preheating electric-furnace charges with towns gas, having for his object the reduction of electricity consumption during the melting-down period. Such experiments might be worthwhile repeating where the price of city gas is attractive.

The oxygen enrichment of the air used for blowing blast furnaces has interest for the readers, in view of the fact that no reference is made to cupola practice. This omission should be rectified in the next edition.

Section III, which deals with medium-purity oxygen, is of the greatest importance, for herein lies the future of all these very interesting metallurgical processes. These developments will require much enterprise and close co-operation. A study of potential costs of medium purity oxygen and ways and means for their reduction are fully discussed in Section IV. The reviewer recommends this book to all those interested in modern trends in ferrous metallurgy.

Pig-iron and Steel Production in Great Britain

The following particulars of pig-iron and steel production in Great Britain have been extracted from the Statistical Bulletin for November, 1948, issued by the British Iron and Steel Federation. Table I gives the production of pig-iron and ferro-alloys in October, with the number of furnaces in blast at the end of the month; Table II, production of steel ingots and castings in October, and Table III, deliveries of non-alloy and alloy finished steel. Table IV summarises steel-industry activities during six months ended October, 1948.

TABLE I.—*Weekly Average Production of Pig-iron and Blast-furnace Ferro-alloys, October, 1948. (Thousands of Tons.)*

District.	Furnaces in 30.10.48	Hematite.	Basic.	Foundry.	Forge.	Ferro-alloys.	Total.
Derby, Leics., Notts., Northants, and Essex	25	0.3	14.4	22.7	1.9	—	39.3
Lancs. (excl. N.W. Coast), Denbigh, Flints. and Ches. / Yorkshire (incl. Sheffield, excl. N.E. Coast)	6	—	0.7	—	—	1.5	8.2
Lincolnshire	14	—	24.9	—	—	—	24.9
North-East Coast	26	9.0	38.0	0.4	—	1.5	48.9
Scotland	9	0.8	11.2	2.9	—	—	14.9
Staffs., Shrops., Worcs., and Warwick	9	—	8.3	1.3	—	—	9.6
S. Wales and Monmouthshire	8	2.5	20.8	—	—	—	23.3
North-West Coast	8	13.3	—	0.2	—	0.6	14.1
Total	105	25.9	124.3	27.5	1.9	3.6	183.2
September, 1948	101	27.4	121.6	26.8	1.9	3.2	180·9*
October, 1947	97	24.2	107.4	25.6	1.5	1.9	160.6*

* Five weeks.

TABLE III.—*Weekly Average Deliveries of Non-alloy and Alloy Finished Steel. (Thousands of Tons.)*

Product.	1947 (53 weeks).	1948 (1st 10 months).	1947. Oct.*	1948. Sept.*	1948. Oct.
Non-alloy Steel :—					
Heavy rails and sleepers	7.6	8.9	7.8	10.7	9.2
Heavy and medium plates	31.6	35.8	33.7	39.3	36.9
Other heavy products	31.8	34.6	32.8	37.0	35.6
Light rolled products (excl. wire rods and alloy-steel bars)	49.7	55.4	57.2	58.0	59.9
Ferro-concrete bars	3.2	4.0	3.7	4.9	4.5
Cold-rolled strip	4.6	4.7	5.0	5.2	5.0
Bright-steel bars	4.8	6.0	5.4	6.4	6.1
Sheets, coated and uncoated	24.3	26.2	25.3	27.6	27.4
Tin, terne and black plate	12.1	13.4	14.0	13.4	12.8
Tubes and pipes	13.5	14.8	15.0	16.1	15.6
Wire	10.8	12.7	11.5	14.0	14.4
Tyres, wheels and axles	3.5	3.8	3.6	4.4	4.4
Forgings	5.0	5.8	5.3	6.6	6.7
Castings	3.0	3.5	3.2	3.6	4.0
Total	205.5	229.6	223.5	247.2	242.5
Alloy Steel :—†					
Tubes and pipes	0.3	0.4	0.4	0.2	0.3
Bars, plates, sheets, strip and wire	3.7	4.6	4.5	5.3	5.2
Forgings	1.8	2.4	2.2	2.7	3.0
Castings	0.6	0.6	0.7	0.7	0.7
Total	6.4	8.0	7.8	8.9	9.2
Total U.K. production‡	211.9	237.6	231.3	256.1	251.7
Less Inter-industry conversion	19.2	28.3	24.1	34.1	33.8
Total U.K. deliveries	192.7	209.3	207.2	222.0	217.9
Add deliveries of imported finished steel	2.2	2.9	2.8	2.6	5.5
Total deliveries of finished steel	194.9	212.2	210.0	224.6	223.4

* Five weeks. † Excludes high-speed steel.
‡ Includes finished steel produced in the U.K. from imported ingots and semi-finished steel.

TABLE II.—*Weekly Average Production of Steel Ingots and Castings, October, 1948. (Thousands of Tons.)*

District.	Open-hearth. Acid.	Open-hearth. Basic.	Bessemer.	Electric.	All other.	Total. Ingots.	Total. Castings.	Total ingots and castings.
Derby, Leics., Notts, Northants and Essex	—	—	10.3(Basic)	0.9	0.2	10.8	0.6	11.4
Lancs. (excl. N.W. Coast), Denbigh, Flints., and Ches. / Yorkshire (excl. N.E. Coast and Sheffield)	1.6	22.2	—	1.2	0.4	24.4	1.0	25.4
Lincolnshire	—	26.5	—	—	0.1	26.5	0.1	26.6
North-East Coast	2.0	57.3	—	0.8	0.5	59.1	1.5	60.6
Scotland	5.1	38.6	—	2.2	0.7	44.8	1.8	46.6
Staffs., Shrops., Worcs. and Warwick	—	13.8	—	0.7	0.8	13.9	1.4	15.3
	11.4	45.4	4.8 (Basic)	0.8	0.1	62.2	0.3	62.5
S. Wales and Monmouthshire	8.2	24.9	—	7.4	0.7	39.3	1.9	41.2
Sheffield (incl. small tonnage in Manchester)	0.6	2.3	4.3 (Acid)	0.3	0.1	7.4	0.2	7.6
North-West Coast	28.9	231.0	19.4	14.3	3.6	288.4	8.8	297.2
Total								
September, 1948	30.3	229.0	19.5	14.4	3.6	288.4	8.4	296.8*
October, 1947	26.4	214.5	18.6	12.4	3.4	267.6	7.7	275.3*

* Five weeks.

(*Continued at foot of facing page.*)

Record Nickel Deliveries in 1948

Total world deliveries of Canadian nickel in all forms for the year 1948 will set a new high peacetime record, although production has been hampered in recent months by electric power shortage, says Mr. Robert C. Stanley, chairman and president of the International Nickel Company of Canada, Limited, in a brief review of the nickel industry in 1948.

During the latter half of the year, he says, the price of nickel was raised by reason of increased production costs, and the fact that the company must mine lower-grade underground ore-bodies to continue a large and steady supply, bringing the price level to well above that prevailing in the pre-war years. As in previous years, the steel industry in the United Kingdom, Canada and the United States was the largest consumer of nickel during 1948, and it is estimated ingot output of chromium-nickel stainless steels during 1948 will be approximately 15 per cent. above that of 1947. Mr. Stanley states that in the United Kingdom considerable attention is now being given to mechanisation in the coal industry, for which various types of nickel alloy are extensively employed.

Looking to the future, Mr. Stanley says the present outlook is for a continued strong demand for nickel, in which event the nickel industry in 1949 should again enjoy a satisfactory year.

Renfrew Foundries' Appointments

Renfrew Foundries, Limited, Hillington, Glasgow, announces that it has appointed fully qualified sales engineers to five areas, as follows:—

SCOTLAND: Mr. R. McGlashan, Renfrew Foundries, Limited, Hillington, Glasgow, S.W.2; SOUTH LONDON AND SOUTHERN ENGLAND: Mr. J. S. Thompson, 53, Tudor Way, Hillingdon, Uxbridge; MIDLANDS AND WALES: Mr. J. A. K. Fergie, The Leys, Adderbury, Banbury, Oxon; NORTHERN ENGLAND: Mr. A. J. Hebden, 41, Nab Wood Crescent, Shipley, Yorks; NORTH LONDON AND EASTERN COUNTIES: Mr. E. P. Mendoza, 16A, Green Court, Green Lane, Edgware, Middlesex.

Obituary

MR. RICHARD JONES PRYCE, who died on December 19 at the age of 82, was a partner in R. J. Pryce & Company, iron merchants, of Lowestoft.

MR. THOMAS HAMPSON, a pioneer of the motor industry and co-founder of the former Vulcan Motor & Engineering Company, Southport, died on December 19 at the age of 80.

MR. NATHANIEL GREENHALGH, who died on December 16 at the age of 63, was a director of Burton, Griffiths & Company, Limited, engineers' machinery and small tool merchants, of Birmingham.

MR. PERCY WILLIAM RUDDOCK, who died on December 17 at the age of 60, was a partner of Jos. R. Scott & Son, consulting engineers, of Newcastle-upon-Tyne. He was a fellow of the Society of Consulting Marine Engineers and Ship Surveyors.

High Quality of British Steel

Mr. I. A. R. Stedeford, chairman of Tube Investments, Limited, speaking at the company's annual meeting in Birmingham, recently, said that it was the largest private buyer of finished steel in the country. With experience of most foreign steels they must acknowledge that British-made steel compared with the best, he said. It was of high quality; the service given by the industry was excellent, and the prices charged were lower than those charged by Continental or American steelmakers in both their home and export markets.

He added: "Indeed, if record outputs, cheaper prices, high quality and great development plans were still measures of efficiency and enterprise, the British steel industry must be well in advance of most others."

A. E. PLUMSTEAD & COMPANY, LIMITED, electric-welding engineers, etc., of Norwich, is being wound up voluntarily. Mr. J. D. Freeman, 5, Opie Street, Norwich, is the liquidator.

PIG-IRON AND STEEL PRODUCTION IN GREAT BRITAIN (*Continued from previous page*).

TABLE IV.—*General Summary of Pig-iron and Steel Production.* (*Weekly Average in Thousands of Tons.*)

Period.	Iron-ore output.	Imported ore consumed.	Coke receipts by blast-furnace owners.	Output of pig-iron and ferro-alloys.	Scrap used in steel-making.	Steel (incl. alloy).			
						Imports.‡	Output of ingots and castings.	Deliveries of finished steel.	Stocks.†
1938	228	89	—	130	118	16	200	—	—
1946	234	115	169	149	147	8	244	192	1,008
1947 (53 weeks)	209	130	165	147	145	8	240	195	797
1948—May	239	173	202	184	175	4	293	205	846
June*	257	171	206	181	180	8	297	223	886
July	253	156	201	171	144	7	232	184	920
August	233	163	200	174	162	6	271	182	986
September*	273	166	202	181	183	10	297	225	1,002§
October	270	166	202	183	184	13	297	223	1,002

* Five weeks. † Stocks at end of years and months shown. ‡ Weekly average of calendar month. § Revised.

Imports and Exports of Iron and Steel

The following tables, based on Board of Trade returns, give figures of imports and exports of iron and steel in November, and the first 11 months of 1948. Figures for the corresponding period of 1938 are given for purposes of comparison.

Total Exports of Iron and Steel.

Destination.	November, 1948.	Eleven months ended November.	Eleven-twelfths of 1938.
	Tons.	Tons.	Tons.
Eire	5,536	63,292	51,076
Channel Islands	1,264	10,510	6,798
Gibraltar	61	2,951	809
Malta and Gozo	647	4,914	2,112
Cyprus	630	3,836	1,518
Palestine	324	13,313	7,398
British West Africa	5,187	43,667	45,598
Union of South Africa	12,379	135,089	211,830
Northern Rhodesia	1,080	11,515	18,860
Southern Rhodesia	2,016	26,311	33,195
British East Africa	7,297	63,156	23,771
Behrein, Koweit, Qatar and Trucial Oman	1,798	25,352	*
India, Pakistan, etc.	9,232	77,138	145,454
British Malaya	2,995	31,461	61,036
Ceylon	1,398	12,669	23,862
North Borneo	765	9,931	106
Hong Kong	2,194	32,251	21,629
Australia	8,324	71,363	156,662
New Zealand	9,010	61,298	120,893
Canada	6,825	27,537	78,292
British West Indies	3,917	37,774	40,563
British Guiana	373	4,355	2,747
Anglo-Egyptian Sudan	1,205	9,329	7,599
Other British countries	1,938	17,415	12,803
Russia	2,176	17,742	3,987
Finland	5,184	66,964	16,140
Sweden	4,152	83,313	10,975
Norway	8,078	63,536	18,584
Iceland	479	4,465	603
Denmark	9,212	80,219	79,984
Poland	222	2,335	2,280
Netherlands	8,816	81,639	47,262
Belgium	968	10,082	18,631
France	1,538	15,187	12,271
Switzerland	1,241	15,524	2,552
Portugal	1,669	22,034	7,070
Spain	308	5,699	7,117
Italy	815	4,857	4,711
Hungary	19	924	29
Czechoslovakia	261	615	2,122
Greece	494	3,841	1,606
Turkey	2,023	19,792	12,611
Dutch East Indies	993	22,090	25,031
Dutch West India Islands	280	6,921	2,258
Belgian Congo	194	1,276	278
Algeria	—	616	48
Portuguese East Africa	351	2,640	13,035
Syria	37	2,613	2,389
Lebanon	2,500	14,778	
Egypt	4,155	43,443	31,542
Iraq	2,705	43,848	23,595
Iran	11,232	97,508	101,181
Burma	1,093	25,766	16,970
Siam (Thailand)	280	2,412	5,497
China	1,009	15,213	20,635
U.S.A.	195	9,929	2,005
Cuba	29	1,805	662
Colombia	644	6,816	3,504
Venezuela	4,969	54,240	4,285
Ecuador	974	3,058	1,460
Peru	61	2,759	2,779
Chile	526	8,918	5,769
Brazil	2,099	17,154	15,574
Uruguay	392	7,079	6,955
Argentine	7,565	99,146	72,743
Other foreign countries	3,039	28,922	74,878
Total	179,472	1,814,145	1,756,219

* Included in "Other British countries" and "Other foreign countries."

Total Imports of Iron and Steel.

From	November, 1948.	Eleven months ended November.	Eleven-twelfths of 1938.
	Tons.	Tons.	Tons.
Australia	1	14,619	33
Canada	6,099	72,619	107,594
Other British countries	774	5,472	147,796
Sweden	1,805	14,832	82,313
Norway	4,165	29,453	30,960
Germany	188	4,400	88,000
Belgium	34,683	178,932	250,874
Luxemburg	8,167	23,855	53,718
U.S.A.	6,301	98,008	183,967
Other foreign countries	9,155	60,233	287,001
Total	71,338	502,423	1,232,247
Iron ore and concentrates—			
Manganiferous	3,500	49,939	57,093
Other sorts	748,995	8,195,105	4,676,714
Iron and steel scrap and waste, fit only for the recovery of metal	100,203	735,387	570,519

Exports of Iron and Steel by Product.

Product.	November, 1948.	Eleven months ended November.	Eleven-twelfths of 1938.
	Tons.	Tons.	Tons.
Pig-iron	271	1,081	86,113
Ferro-alloys, etc.—			
Ferro-tungsten	150	877	473
Spiegeleisen, ferro-manganese	181	3,011	4,763
All other descriptions*	71	719	960
Ingots, blooms, billets and slabs	783	5,447	8,932
Iron bars and rods	564	5,858	2,931
Sheet and tinplate bars, wire rods	327	3,997	14,264
Bright-steel bars	2,306	21,242	6,039
Other steel bars and rods	9,524	104,513	93,503
Special steel	1,351	17,040	4,521
Angles, shapes and sections	9,662	86,894	61,303
Castings and forgings	766	5,488	1,483
Girders, beams, joists and pillars	1,482	18,319	30,682
Hoop and strip	5,485	38,198	34,262
Plate, ⅛ in. thick and over	10,561	113,715	120,048
Black plates	—	38,738	13,327
Black sheets	10,052	60,622	58,218
Galvanised sheets	7,886	83,744	134,690
Tinplates	20,147	178,069	292,702
Tinned sheets	1,354	5,294	1,293
Terneplates	42	191	3,965
Decorated tinplates	405	1,968	4,004
Other coated plates	59	3,109	206
Cast-iron pipes, up to 6-in. dia.	6,588	60,480	44,850
Do., over 6-in. dia.	6,704	53,746	39,383
Wrought-iron tubes	25,743	271,697	201,641
Radiators and central-heating boilers	292	3,026	3,693
Railway material	12,797	173,872	144,975
Wire	3,649	36,877	50,584
Cable and rope	2,112	24,813	15,034
Netting, fencing and mesh	1,672	16,313	8,632
Other wire manufactures	1,437	9,111	3,366
Nails, tacks, etc.	1,000	6,947	3,490
Rivets and washers	1,235	8,518	7,824
Wood screws	385	3,896	2,302
Bolts, nuts and metal screws	2,055	20,422	16,109
Stoves, grates, etc. (excl. gas)	947	10,653	6,421
Do., gas	281	2,739	1,967
Sanitary cisterns	181	1,474	2,577
Fencing material	163	2,779	4,703
Anchors, etc.	676	8,685	5,808
Chains, etc.	692	8,422	5,767
Springs	939	6,413	3,603
Hollow-ware	4,981	66,503	9,812
All other manufactures	21,514	218,625	194,996
Total	179,472	1,814,145	1,756,219

* The figures for 1938 are not completely comparable with those for subsequent years.

News in Brief

JAMES & RONALD RITCHIE, LIMITED, Middlesbrough, is to erect a new patternshop.

CYC-ARC, LIMITED, has opened a new factory in South Wales for the manufacture of studs and attachments for its stud-welding equipment.

THIRTY-NINE EMPLOYEES of George Cohen, Sons & Company, Limited, and other companies in the "600" group recently received long-service awards for 25 years' service or over.

AN INVITATION from the T.U.C. for a joint conference in January to consider productivity in the engineering industry has been accepted by the Confederation of Shipbuilding and Engineering Unions.

IN FUTURE, the Combustion Appliance Makers' Association (Solid Fuel) will be known as the Combustion Engineering Association. The headquarters will remain at 24, Tottenham Court Road, London, W.1.

MR. F. BROWN, secretary of the company, and MR. T. M. ELLIOT, chief metallurgist and research chemist, have been appointed special directors of Arthur Lee & Sons, Limited, steelmakers, etc., of Sheffield.

R. & A. MAIN, LIMITED, ironfounders, etc., is to erect a building at its Falkirk works to provide accommodation for workers' spray baths and for the storage of work clothes at an estimated cost of £5,250.

MORE THAN 30 WORKERS employed by Hepworth & Grandage, Limited, piston manufacturers, etc., of Bradford, all with at least 25 years' service, received gold watches from the managing director, Mr. William Hepworth last Thursday.

IRON-ORE MINING in the Cleveland district was fast becoming played out, said Dr. H. C. Versey, of Leeds University, at Middlesbrough recently. Seventy years ago there were perhaps 100 mines in the area, but now there were under a dozen.

EACH MEMBER of the staff of the Mond Nickel Company, Limited, who has served the company for 25 years, is being presented with a gold button by Sir William T. Griffiths, chairman and managing director. There are 526 eligible for this recognition.

MR. S. T. OWEN, acting secretary of the Wolverhampton committee for the recruitment of young workers in the foundry industry, hopes to hold an exhibition and some film shows in March to which school leavers and their parents will be invited.

TWENTY-EIGHT WORKMEN of C. & J. Hampton, Limited, tool manufacturers, ironfounders, etc., of Sheffield, who have been employed by the company for more than 30 years, have received presentations. Three women with more than 20 years' service have also received gifts.

OUTPUT RETURNS for 1948, issued by Harland & Wolff, Limited, Belfast, show that the tonnage of merchant vessels launched by the company during the year amounted to over 126,000 tons gross. During the first three full post-war years the company's total output of vessels launched has, therefore, approximated half a million tons gross.

LARGE-SCALE EXTENSIONS to the Bainsford factory of the British Aluminium Company, Limited, at a cost of £493,000, were approved by Falkirk Dean of Guild Court on December 16. At the same Court, the Falkirk Iron Company, Limited, received permission to proceed with the erection of baths and changing-rooms at an estimated cost of £17,500.

SUNVIC CONTROLS, LIMITED, announces that its sales department is now at 10, Essex Street, Strand, London, W.C.2 (telephone: Temple Bar 7064). The following departments are now at 132-135, Long Acre, London, W.C.2 (telephone: Temple Bar 3444):—Sales department (shipment); purchasing department; accounts department; goods inwards department.

IMPORTS OF IRON AND STEEL and manufactures (excluding cutlery and machinery) into Eire in October were valued at £508,206, against £575,667 in the corresponding month of 1947. The total value for the first 10 months of 1948 was £5,378,185, against £3,906,884 in 1947. Imports in October included the following:—Pig-iron, 849 tons, valued at £18,034, against 191 tons (£3,788) in October, 1947; iron bars and rods, 31 tons (£1,474), against 94 tons (£3,739); steel bars and rods, 1,301 tons (£49,000), against 2,223 tons (£86,353); iron and steel squares and flats, 353 tons (£13,801), against 784 tons (£29,805).

IN A SPEECH at Sunderland at the launch of the 9,200-ton motorship Trelyon, Sir George Christopher, chairman and managing director of the Hain Steamship Company, London, and president of the Chamber of Shipping, said that when the shipbuilders eventually disclosed the price of the vessel it would be "staggering." He believed that shipbuilders were just as disturbed as shipowners by mounting costs, but he was not so sure whether the many subcontractors of the builders were equally disturbed. Unless builders and contractors could combine to bring down costs, the time must come, if it had not already arrived, when there could be no more orders except for special types of ship.

THE GRAND JURY of the Great Barmote Court, the authority which administers the ancient lead-mining laws, on December 16, at Matlock, upheld its former decision granting Mr. Charles Frederick Upton, a Wirksworth quarryman, the ownership of a rich deposit of lead ore which he discovered in the limestone quarry where he worked. His employers, Bowne & Shaw, Limited, had asked the grand jury for another view on the ground that blasting had uncovered old workings near the new deposits and claimed that this made the new vein part of the Gells Northcliffe Mine, of which the firm holds the title. Members of the grand jury explored the workings and confirmed their previous opinion that the vein was a new one and that the workings had no connection with the Gells Northcliffe Mine.

Personal

SIR STEPHEN J. PIGGOTT has resigned from the board of John Brown & Company, Limited, Clydebank.

MR. H. J. PENN, a director, has been appointed general manager of the Murex group of companies.

MR. C. H. TONKIN has retired from the board of Spencer (Melksham), Limited, manufacturers of elevating and conveying machinery.

MR. M. H. DIXON has been appointed financial director of Hills Patent Glazing Company, Limited, West Bromwich, with effect from January 1.

MR. J. H. W. PAWLYN has been appointed deputy chairman of Ruston & Hornsby, Limited, engineers, steel and iron founders, etc., of Lincoln.

MR. A. T. GREEN, director of the British Ceramic Research Association, has been awarded the hon. degree of Doctor of Science of Leeds University.

MISS EDITH PITT, industrial welfare officer of Tubes, Limited, Birmingham, has been recommended for election as prospective Parliamentary candidate by the executive committee of the Stechford Division Unionist Association.

MR. D. W. TURNER, chairman and managing director of the Wellington Tube Works, Limited, Tipton, Staffs, has been elected to the board of the Midland Bank, Limited, and of the Midland Bank Executor & Trustee Company, Limited.

MR. IVOR JENKINS, chief metallurgist at the research laboratories of the General Electric Company, Limited, Wembley, was admitted to the degree of Doctor of Science at a congregation of the University of Wales held recently at the University College of Swansea.

MR. R. J. A. DUNN, works manager of Stokes, Taylor & Shaw, Limited, structural engineers, electric welders, etc., of Sutton-in-Ashfield, Notts, has been elected chairman of the Nottingham Industrial Accident Group of the Royal Society for the Prevention of Accidents. MR. I. GIRLING, safety officer of Aveling-Barford, Limited, Grantham, Lincs, is the new vice-chairman.

SIR PERCY HERBERT MILLS, managing director of W. & T. Avery, Limited, manufacturers of weighing and testing machines, etc., of Smethwick, has been elected deputy chairman of the Federation of Chambers of Commerce of the British Empire. He was last year's president of Birmingham Chamber of Commerce. Sir Percy is a past-president of the Birmingham, Wolverhampton and Stafford district of the Engineering and Allied Employers' Federation.

MR. E. BRUCE BALL (Glenfield & Kennedy, Limited) has been elected chairman of the British Valve Manufacturers' Association in succession to MR. J. M. STOREY (Dewrance & Company, Limited), who has now held office for two years. Mr. Storey has been elected vice-chairman of the Association. The following have been elected to serve on the Executive Committee:—MR. C. H. ARMSTRONG (Copes Regulators, Limited), MR. R. A. BLAKEBOROUGH (J. Blakeborough & Sons, Limited), MR. O. E. DICKINSON (Smith Bros. & Company (Hyson), Limited) and MR. N. J. HOPWOOD (Adams-Hydraulics, Limited).

Company News

(Figures for previous year in brackets.)

POWER-GAS CORPORATION—Dividend of 12½% (same).

BLUEMEL BROS.—Final dividend of 12½%, making 15% (same).

C. LINDLEY & COMPANY—Final dividend of 20%, making 25% (same).

RENOLD & COVENTRY CHAIN COMPANY—Interim dividend of 3% (same).

WEST'S GAS IMPROVEMENT COMPANY—Interim dividend of 5% (same).

ROTHERHAM FORGE & ROLLING MILLS COMPANY—Interim dividend of 5% (same).

MULLINERS (HOLDINGS)—Dividend of 20% (same). The company was made public last February.

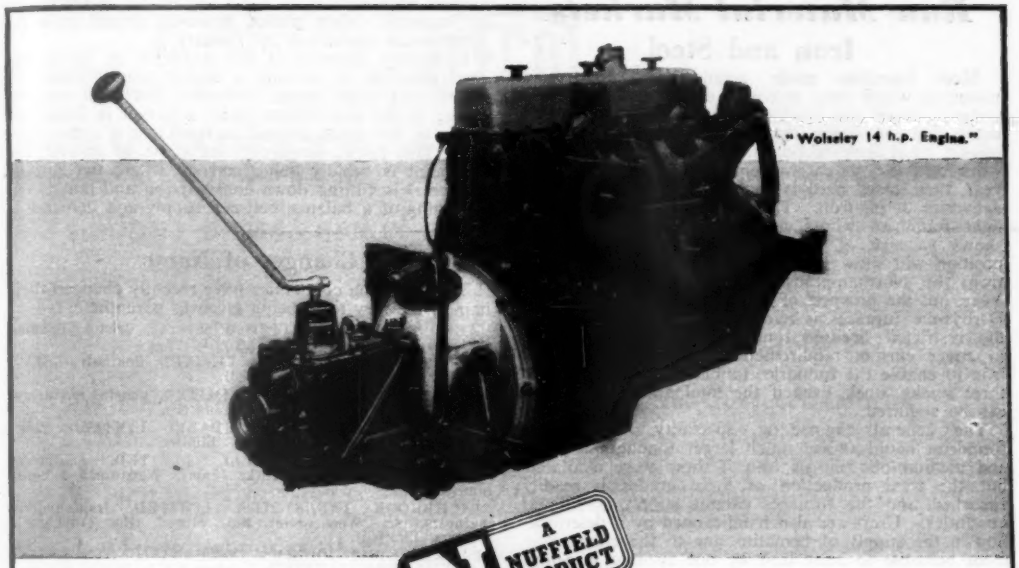
W. J. HARRIS & COMPANY—Dividend due on January 1 on the 7½% cumulative participating preference shares will not be paid.

GENERAL CABLE MANUFACTURING COMPANY—Second interim dividend of 30%, to be confirmed as final, making 50% (same).

SPECIALLOID—Consolidated accounts of Specialloid and Aero Piston Ring Company for the year to March 31, 1948, show:—Trading profit, £5,486; profit on sales of fixed assets, £2,340; directors' fees waived, £420; investment interest, £38; to bank charges, £19,715; depreciation, £24,969; directors' remuneration, £10,339; audit, £1,200; provision against stocks, £17,422; compensation to past director, £5,000; donations, £551; loss, £70,912; brought in, £19,137; general reserve written back, £36,750; to minority interest in profits of Aero Piston Ring, £5; interim dividends of 2½% on preference shares to November 15, 1947, £3,025; 25% on ordinary shares, £6,501; loss on sale of Specialloid (Canada); total investment as at March 31, 1948, £111,582, provision for loss after March 31, £10,000; to appropriation from share premium reserve, £90,000; leaving, £31,582; forward, group debit, £55,138 (Specialloid debit £57,247, Aero Piston Ring credit, £2,109). The accounts of Specialloid (Canada) for 15 months to March 31, 1948, show a loss for the period of $282,858.

SOUTH DURHAM STEEL & IRON COMPANY—Profit to September 30, £531,527 (£165,806); profit arising from past years, £34,806 (£108,251); profit from realisation of investment, £1,589 (£43,293); to depreciation, £120,000 (same); special expenditure on plant, nil (£97,676); directors' fees, £2,000 (£1,452); auditors' remuneration and expenses, £778 (same); staff pensions and life assurance schemes, £8,751 (£6,661); supplementary non-contributory pensions, £5,000 (same); debenture stock trustees' remuneration £420 (same); interest on 4% perpetual debenture stock, £13,500 (same); interest on 4% mortgage debenture stock, £27,583 (£27,964); sinking fund for 4% mortgage debenture stock, £9,917 (£9,536); tax provision, £115,000 (nil); net profit, £264,973 (£34,363); to reserve for future development and other purposes, £222,000 (nil); preference dividend, £7,425 (same); provision for preference dividend accrued to September 30, £2,475 (same); dividend of 10% (8⅓%) on the "A" ordinary shares and of 4% (2⅔%) on the "B" ordinary shares; forward, £126,013 (£125,122).

TURNER & NEWALL—Consolidated trading profit for the year ended September 30, £7,726,099 (£6,043,513); to depreciation, £637,484 (£632,137); amortisation of mining properties, £156,394 (£157,034); development of mining properties, £77,520 (£70,266); deferred repairs, £3,540 (£1,619); possible obsolescence of stock-in-trade, nil (£110,000); auditors' remuneration and expenses, £6,948 (£6,943); interest on bonds issued by subsidiary, £21,320 (nil); pension scheme (special back-service contributions), nil (£180,534); leaving £6,822,893 (£4,884,980); income from investments, etc., £155,920 (£127,081); to tax, £3,796,763 (£3,699,893); specific reserve, £635,000 (£410,000); leaving £2,547,050 (£902,168); liabilities set up in previous years, no longer required, £509,192 (nil); profit exceptional to this year due to change in the accounting date of a subsidiary, £90,363 (nil); taxation provision in books of overseas subsidiary no longer required, £360,000 (nil); attributable to minority interests, £20,280 (£18,059); carried forward by subsidiaries, £883,964 (£67,871); to appropriation account of parent company, £2,602,361 (£816,238); to reserve against investments in overseas subsidiaries, £1,000,000 (£89,180); preference dividend net, £55,604 (same); final ordinary dividend of 11¼%, making 15% (same); pension fund (additional grant), £20,000 (same); general reserve, £1,000,000 (£200,000); forward, £479,914 (£393,592).



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Raw Material Markets

Iron and Steel

Most foundries made arrangements to receive materials which were delivered during the holidays in order to avoid any hindrance in deliveries of pig-iron, every ton of which is needed to augment meagre stocks. Although foundries, generally, have sufficient work on hand to carry them well forward into next year, their chief need is for larger and more regular deliveries of pig-iron. This applies particularly to the light foundries whose need of high-phosphorus iron shows no sign of abatement. It is hoped that the position will show improvement by increased supplies from the Northamptonshire area early in the New Year, but the prospect of increased deliveries from the Derbyshire furnaces is remote. In a number of cases the restricted licensed tonnages are barely sufficient to cover current requirements and provide sufficient iron to enable the foundries to build up the permitted three weeks' stock, even if the total allocated tonnage can be acquired.

The general engineering, speciality, and jobbing foundries could utilise much larger tonnages of low- and medium-phosphorus iron if these were available, but the total production of these grades is readily absorbed and the furnaces cannot supply additional quantities. Users are also handicapped by a deterioration in the supply of hematite, due to the changeover from hematite to basic iron by one furnace in South Wales; in consequence, there are reports of a wider call for the refined grades to eke out these shortages. Deliveries of foundry coke are being maintained at allocated levels and ganister, ferro-alloys and limestone are coming through freely; firebricks, however, are still difficult to obtain promptly.

Re-rollers are handicapped by a shortage in supplies of re-rolling steel, and this is very noticeable in the case of the re-rollers of small bars, sections, and narrow strip, for which square billets in sizes of 2 in. to 3 in. and small flat billets are required. Considerable outputs of semis are being obtained from home sources, but these consist mostly of the heavier sizes of billets, blooms and slabs. There is an insistent demand for strip and sections, particularly the lighter gauges, and deliveries of sheets are much below requirements, as the re-rollers are unable to obtain sufficient sheet bars.

Bigger outputs of heavy steel products have enabled the makers to devote more material for shipment overseas. The expansion of exports is most noticeable in the case of sheets and tubes, pipes, etc., but shipments of plates and rails were also increased in the closing weeks of the year. There is, moreover, a very active home demand for plates and sections, and most of the makers are almost fully booked for the next six months.

Non-ferrous Metals

Although, generally, the Christmas holidays are now over, some firms have not yet resumed work owing to annual stocktaking. This was also the cause of an easing in business just prior to the holiday, when consumers were anxious to avoid any undue accumulation of material. Most plants, however, should have recommenced operations by January 3.

Secondary material is still available in fairly full quantities and is proving a useful reinforcement to supplies of virgin metal. Whether 1949 will see any easing in the non-ferrous metal situation is somewhat doubtful, for prices are still inclined to rise rather than fall. This spiral, however, must come to an end, for the point is rapidly being reached where the cost of the metal is cutting down consumption and that is the beginning of a balance between supply and demand.

Changes of Name

The following companies have recently changed their names, the new titles being given in parentheses:—

AERO ENGINES, LIMITED, Kingswood, Bristol (Douglas (Sales & Service), Limited).

SHEET METAL WELDERS, LIMITED, Southall (S.M.W. Manufacturing Company, Limited).

PENNEY & PORTER (1932), LIMITED, general engineers, etc., Lincoln (Penney & Porter, Limited).

CRAFT ENGINEERS (ROCHDALE), LIMITED, Manchester (Craft Textile Engineers, Limited).

WOODHOUSE & MITCHELL, LIMITED, engineers, founders, etc., Brighouse, Yorks (James Wadsworth & Sons, Limited).

INCHBROOK INDUSTRIES, LIMITED, ironfounders, engineers, etc., Woodchester, near Stroud, Glos (Inchbrook Printers, Limited).

PARKER KISLINGBURY & COMPANY (ENGINEERING & SAWMAKERS), LIMITED, London, E.C.3 (Parker Kislingbury & Company (Engineers & Sawmakers), Limited).

Token Imports in 1949

The Board of Trade has announced that the token import scheme in 1949 will continue on the same basis as in 1948. The token annual import quota will remain 20 per cent. of the value of each manufacturer's average trade in 1936 to 1938 with the United Kingdom in the commodity concerned. Countries taking part in the scheme will be Australia, Belgium and Luxemburg, Canada, Denmark, Finland, France, Holland, India, Italy, Norway, Pakistan, Sweden, Switzerland, and the United States.

Fewer Controls in New Year

Mr. Harold Wilson, President of the Board of Trade, told Welsh industrialists on December 18 that he hoped to withdraw certain controls, "which we now think can be safely taken off," early in the New Year. "But I will certainly not remove any against the national interest," he said. "One of these is the control which prevents industrialists setting up in already heavy industrialised and populated areas."

Mr. Wilson had been visiting pockets of unemployment in North Wales.

ROCKMAN ENGINEERING COMPANY, LIMITED, is being wound up voluntarily. Mr. R. F. Bendall, 31, Lloyd Street, Manchester, 2, is the liquidator.

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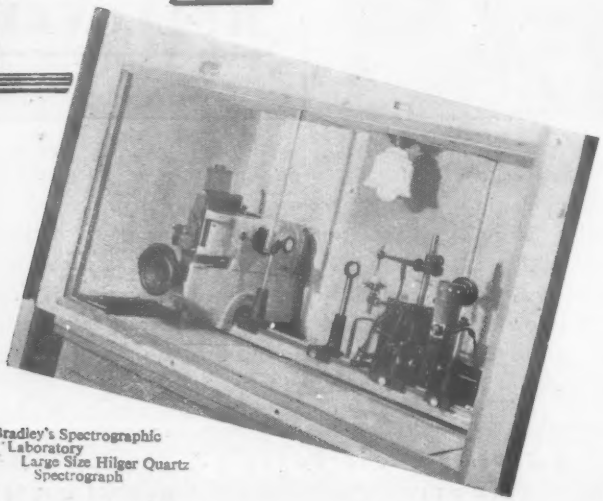
Bradley's spectrographic laboratory is the first in the country to operate exclusively in the routine control of refined iron and cast iron. It adds to their resources yet another of the modern tools provided by the physicist; a powerful weapon in the quality control of Bradley's refined pig iron.



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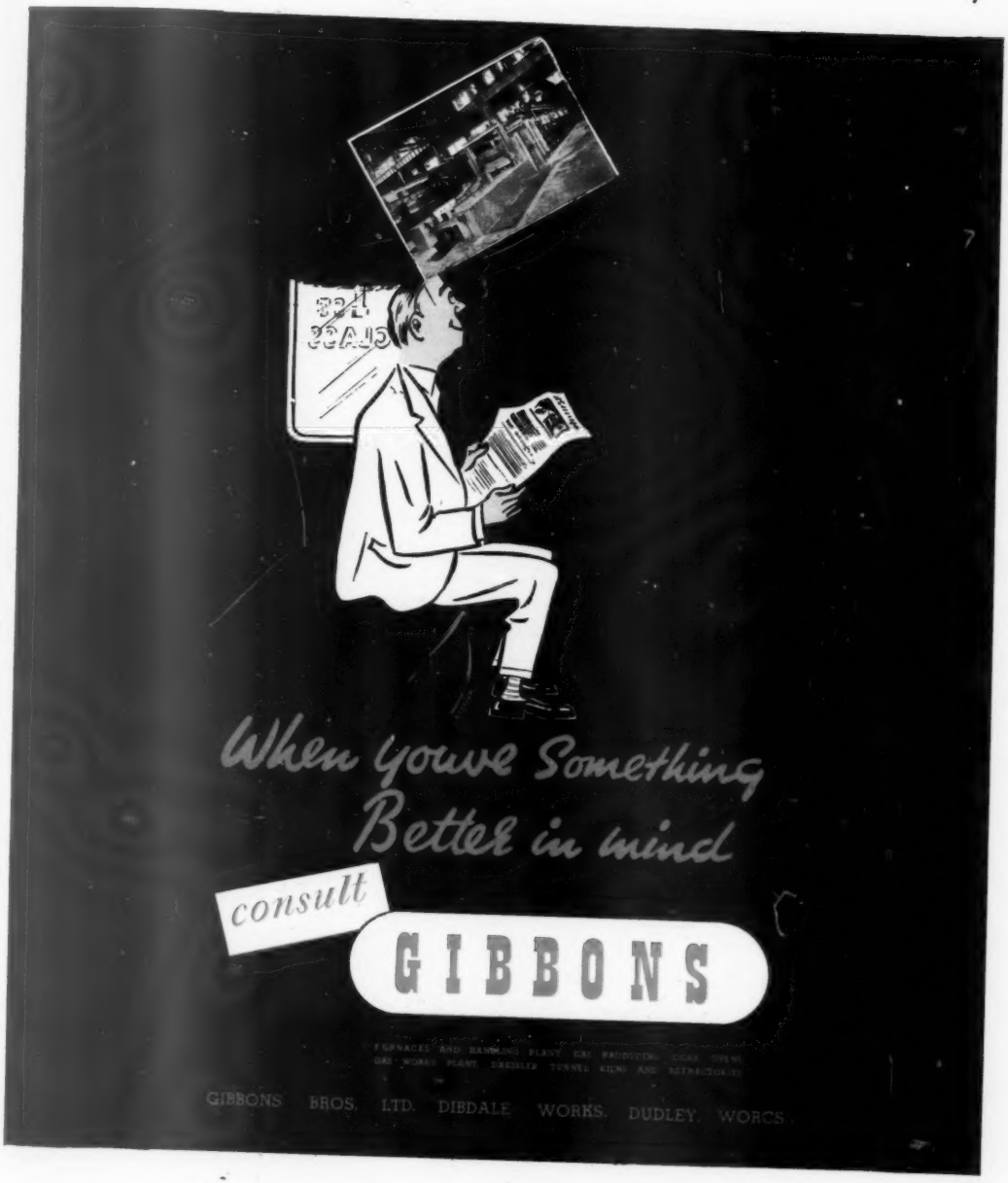
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Size, weight, cross section and shape of castings are constantly changing, whilst patterns may consist of broken or worn parts of machinery, or skeleton outlines with strickles as guides to the finished product.

Frequently when patterns are supplied, these are in block outline designed to reduce pattern making costs. In such cases, undercuts, pockets and other irregularities are fashioned by cores, and it is common experience in the case of improvised patterns, that cores are required to withstand considerable handling and carding in course of final positioning.

Such cores must be robust and require a good bond to develop the necessary strength in all stages of production.

The photographs on this page display cores of this type, and it will be observed that black sand packings are employed to support any overhanging sections whilst the cores are undergoing baking.

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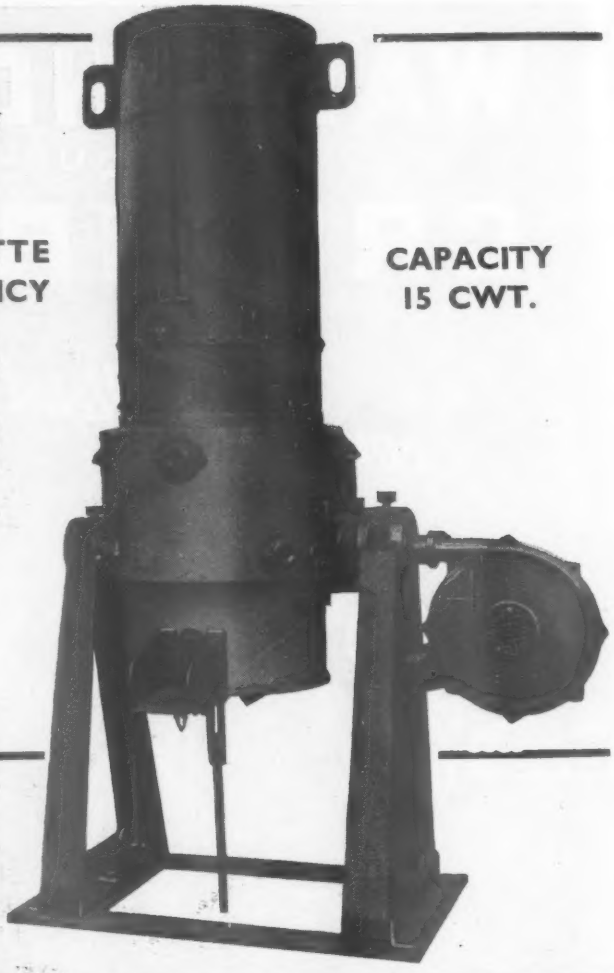

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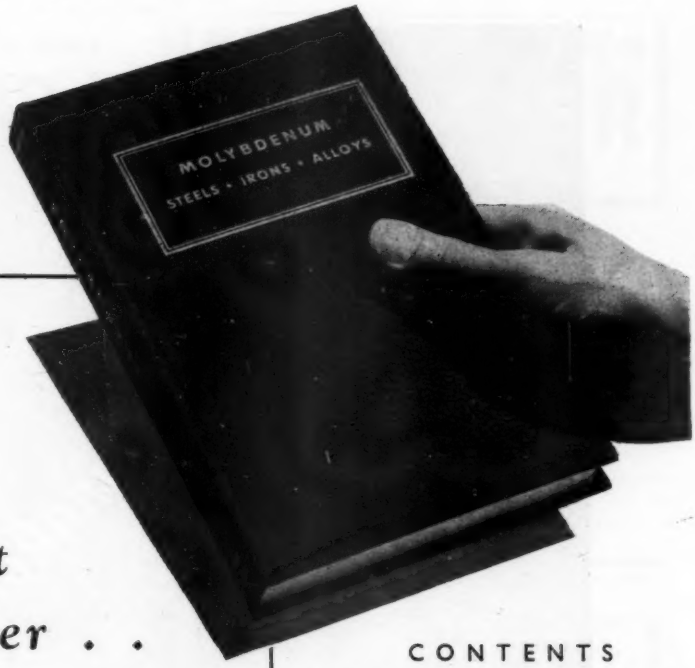

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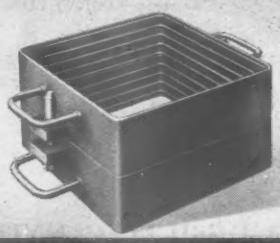

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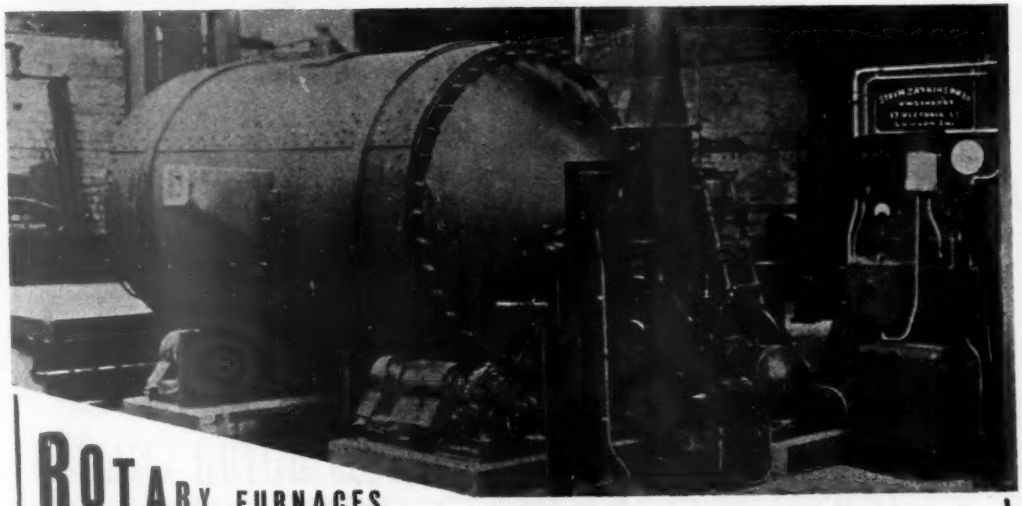

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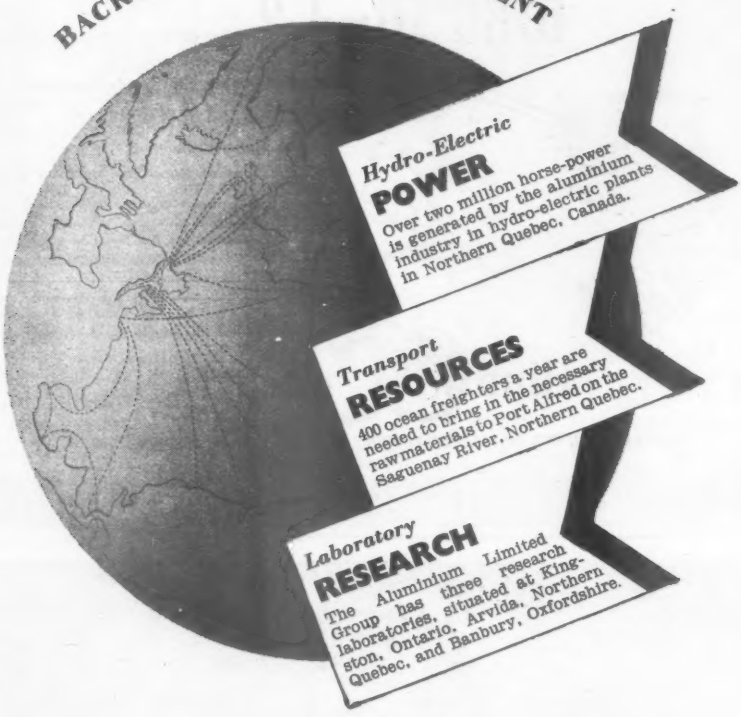
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Over two million horse-power is generated by the aluminium industry in hydro-electric plants in Northern Quebec, Canada.
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One important feature of global geography is that the locations most suitable for large-scale production of virgin aluminium are literally "oceans apart". The reason is the need for cheap and abundant hydro-electric power. Likewise, the principal raw materials of aluminium, such as bauxite and cryolite, are often found commercially in places far distant from the production centres. Transport by sea, land or both, is, therefore, a vast undertaking.

These difficulties overcome, yet another problem arises. For pure aluminium, like pure gold, lends itself only to a limited number of uses. Before it can become sheet suitable for the builder or a high strength casting, aluminium must be alloyed with sister metals, and all manner of physical and mechanical conditions must be investigated before the properties of the metal can be established.

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The dates given are the latest on which tenders will be accepted. The addresses are those from which forms of tender may be obtained. Details of tenders with the reference E.P.D. can be obtained from the Export Promotion Department, Board of Trade, Thames House North, Millbank, London, S.W.1.

CAMBRIDGE, January 6—Supply of cast-iron kerb outlets, gully grates and frames, etc., for the County Council. Mr. F. E. Bayliss, county surveyor, Shire Hall, Cambridge.

DUBLIN, January 11—Supply of 20,000 yds. of steel wire rope, for the Commissioners of Public Works. Mr. T. J. Morris, secretary, Office of Public Works, Dublin.

LEXDEN AND WINSTREE, January 19—Provision and laying of iron pipe water mains, etc., for the Rural District Council. Elliott & Brown, consulting engineers, Stanley House, Pelham Road, Nottingham. (Fee £3 3s., returnable.)

LONDON, E., January 26—Supply of iron, ironmongery, tools, sewer ironwork, etc., for the Metropolitan Borough of Hackney. The Borough Engineer and Surveyor, Town Hall, Hackney, London, E.8. (Fee £1 1s., returnable.)

LONDON, S.E., January 10—Road studs, cast-iron gully grates, frames and manhole covers, for the Borough of Camberwell. Mr. W. Bell, borough engineer and surveyor, Town Hall, Camberwell, London, S.E.5.

MALDON, January 18—Construction of approx. 1,000 yds. of 6-in. dia. and 350 yds. of 9-in. dia. stoneware sewers and 200 yds. of 9-in. dia. cast-iron sewers and manholes, etc., for the Rural District Council. Mr. I. M. Nicholson, engineer and surveyor, Council Offices, Wantz Road, Maldon. (Fee £2 2s., returnable.)

OLDBURY, January 17—Supply of guttering, lead pipe, etc., for the Borough Council. Mr. A. Culwick, town clerk, Municipal Buildings, Oldbury.

SLEAFORD, January 22—Supply of traffic signs and tubular posts, gully gratings and frames, etc., for the County Council. The County Surveyor, County Offices, Sleaford, Lincolnshire.

Increases of Capital

Details of increased capital have been announced by the following companies:—

STANMORE SPRINGS, LIMITED, Dalston, London, N.1, increased by £9,000, in £1 shares, beyond the registered capital of £1,000.

ROAD MACHINES (DRAYTON), LIMITED, West Drayton, Middx, increased by £3,500, in £1 ordinary shares, beyond the registered capital of £1,500.

CARDWELL & KEENE, LIMITED, metal merchants, platers, etc., of Hull, increased by £2,000 in £1 ordinary shares, beyond the registered capital of £2,000.

TRESS ENGINEERING COMPANY, LIMITED, Kingsway, London, W.C.2, increased by £900, in £1 ordinary shares, beyond the registered capital of £100.

K. M. PRESSINGS, LIMITED, manufacturers of diecastings, stampings and forgings, etc., of Hull, increased by £2,900, in £1 ordinary shares, beyond the registered capital of £100.

JAMES SMETHHURST & SON, LIMITED, engineers, iron and brass founders, etc., of Warrington increased by £30,000, in £1 ordinary shares, beyond the registered capital of £20,000.

WOODLAU INDUSTRIES, LIMITED, electrical engineers and manufacturers, etc., of Hanover Street, London, W.1, increased by £3,500, in 500 ordinary and 3,000 "A" ordinary shares of £1 each, beyond the registered capital of £5,000.

E. DYNE & COMPANY, LIMITED, electrical, consulting and mechanical engineers, etc., of Catford, London, S.E.6, increased by £10,000, in £1 preferred ordinary shares, beyond the registered capital of £1,800 preferred ordinary shares of £1 and 4,000 deferred shares of 1s. each.

LOW PHOSPHORUS
REFINED & CYLINDER
HIGH DUTY
MALLEABLE
DERBYSHIRE
NORTHAMPTONSHIRE

PIG-IRON

WILLIAM JACKS & CO. LTD.
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Winchester House, Old Broad Street.
London Wall 4774 (6 Lines)

FERRO-SILICON
FERRO-ALLOYS
BRIQUETTES
ALL NON-FERROUS
METALS & ALLOYS
MOULDING SAND

And at—

BIRMINGHAM, 2, 39, Corporation St. Midland 3375/6
LIVERPOOL, 2. 13, Rumford St. Central 1558
GLASGOW, C.2. 98, Hope Street, Central 9969

NOTICE

Small Advertisements in this section of the Journal are accepted at the *prepaid* rate of 20 words for 5/- (minimum charge) and 2d. per word thereafter. Box number advertisements 2/- extra. Instructions together with remittance must be received not later than first post on Wednesday for inclusion in Thursday's issue addressed to the Advertisement Manager, Foundry Trade Journal, 49 Wellington St., London, W.C.2.

Situations advertised under this heading are available only to applicants excepted from the Control of Engagement Order, 1947, No. 2021.

Replies to Box Numbers to be addressed to :— "Foundry Trade Journal," 49, Wellington Street, London, W.C.2.

SITUATIONS VACANT

A CHIEF RESEARCH METALLURGIST required for medium-sized Yorkshire Steel Manufacturing Co.; in addition to a Degree or Qualification in Chemistry and/or Metallurgy it is desirable for applicants to have 5 years' practical supervisory or executive experience in Industrial Works, preferably with some experience of steel manufacture, machine shop practice, and application of steel to industry generally; substantial salary to successful applicant, with possibility of house available; please state age, experience, qualifications, and salary required.—Box 122, FOUNDRY TRADE JOURNAL.

ALLOY & CARBON STEEL FOUNDRY requires a Core Shop HEAD FOREMAN; must be fully conversant with modern production methods; good organising ability essential.—Details of experience and salary required to Box 90, DORLAND ADVERTISING, 18/20, Regent Street, London, S.W.1.

ASSISTANT METALLURGIST required for control work in Laboratory, ferrous and non-ferrous, Manchester district; should have experience in general analytical work, sand testing, etc., and preferably some experience of cupola control; age about 20.—Reply, stating age, experience, and salary, to Box 144, FOUNDRY TRADE JOURNAL.

CHARGEHAND FETTLER required for Foundry in North Midlands specialising in High Alloy Steels; applicants should have good practical experience in steel drawing and be capable of training unskilled labour.—Reply, with full particulars, to Box 146, FOUNDRY TRADE JOURNAL.

DRAUGHTSMEN (Senior and Junior) for N.W. London area; experienced in conveyor and elevator design and detailing, or able to design light competitive structures.—Apply in strictest confidence to Box 133, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT—*Contd.*

NORTHAMPTON POLYTECHNIC, ST. JOHN STREET, LONDON, E.C.1.

APPLICATIONS are invited for the post of LECTURER IN METALLURGY, in the Department of Applied Chemistry; candidates should be of good academic standing, industrial and/or research experience would be an added qualification; duties of the person appointed will include the teaching of Engineering Metallurgy for the B.Sc.(Eng.) degree of the University of London, metallurgy for the examinations of the Institution of Metallurgists, City and Guilds of London Institute, and for National Certificates; salary in accordance with the London Burnham Scale for technical teachers, and in addition an annual remuneration of £50 will be offered as a post of special responsibility; application forms to be returned by February 12, 1949.—Further details and form of application may be obtained from the SECRETARY.

A WELL-KNOWN Firm in the London area has vacancies for several SENIOR DRAUGHTSMEN; applicants should have experience of conveyors, elevators, and light structural steelwork; a knowledge of foundry mechanisation plants would be an advantage.—Please write, giving particulars of age, experience, and salary required, to Box 150, FOUNDRY TRADE JOURNAL.

EXPERIENCED DIE DESIGNER required for Light Alloy Foundry situated in the Midlands; applicants must have thorough experience of die design for gravity and pressure castings, and be capable of applying modern labour saving methods and of proving practicability of design and technique by actual demonstration.—Replies, stating previous experience, salary expected, etc., to Box 106, FOUNDRY TRADE JOURNAL.

FOREMAN COREMAKER required for a Steel Foundry producing Carbon & Alloy Steel Castings; position a progressive one.—Details of experience and salary required to Box 92, DORLAND ADVERTISING, 18/20, Regent Street, London, S.W.1.

FIRST-CLASS Foundry Commercial REPRESENTATIVE required to operate on behalf of a large West of England concern in promoting the sale of Iron Castings and Chain Cable; applicants must be thoroughly experienced and have good connections.—Full details together with salary required, to be sent to Box 134, FOUNDRY TRADE JOURNAL.

MOULDERS and COREMAKERS required in the South Lancashire region; used to medium and heavy castings in either steel or cast iron; standard district rates, piece work, overtime, good working conditions and stability of employment.—Apply Box 126, FOUNDRY TRADE JOURNAL. Published by permission of the Ministry of Labour and National Service under the Control of Engagement Order.

SITUATIONS VACANT—*Contd.*

FOUNDRY MANAGER required in Luton for Iron and Brass Foundries; 100 employees.—Box 110, FOUNDRY TRADE JOURNAL.

METHODS AND ESTIMATING ENGINEER required for a small Foundry in North Midlands, producing special grade high steel alloy castings; applicants should give full particulars of their qualifications, experience, and salary required.—Box 148, FOUNDRY TRADE JOURNAL.

REQUIRED by a large Steel Foundry a COREMAKING METHODS ENGINEER; knowledge of modern production methods, including coreblowing, essential.—Details of experience and salary required to Box 94, DORLAND ADVERTISING, 18/20, Regent Street, London, S.W.1.

SALESMEN required, preferably experienced foundrymen, capable demonstrations, required carry additional line value all foundries; good commission.—Full details to Box 908, FOUNDRY TRADE JOURNAL.

PARTNERSHIP REQUIRED

GREY Iron Foundry; Junior Partnership required; good technical experience.—Box 112, FOUNDRY TRADE JOURNAL.

BUSINESSES WANTED

GROUP of Light Repetition Ironfounders, with own machine shops desirous of acquiring further subsidiary; either well-run modern Repetition Iron-Foundry, minimum output 50 tons castings weekly, or Finished Engineering Product, capable mass production.—Apply in confidence, Box 142, FOUNDRY TRADE JOURNAL.

WANTED, to purchase, Grey Iron Foundry; West Midland area; all replies answered.—Box 104, FOUNDRY TRADE JOURNAL.

WANTED, to Purchase, Small Iron Foundry.—Main details in first instance to Box 130, FOUNDRY TRADE JOURNAL.

BUSINESS FOR SALE

FOR SALE.

By

PRIVATE Bargain, the Business of Brass and Ironfounders carried on by Lowson & Nicoll, Forfar Foundry, Forfar, along with the heritable property at Service Road, Forfar; this is an old-established business, with a fine connection, and only comes on the market by reason of the recent death of the surviving partner, Mr. Walter Nicoll; assessed rent £60 10s., feuduty nominal.—Full particulars from the subscribers, who are prepared to negotiate immediately with a suitable applicant.

W. & J. S. GORDON,
Solicitors, Forfar.

AUCTION NOTICE

BY Order of the Receiver and Manager, A. H. Edwards, Esq., F.S.A.A., re PARAGON FOUNDRY, LTD.

PELICAN WORKS, FOLLY MILL LANE, BRIDPORT, DORSET.

HENRY BUTCHER & CO.
are instructed to offer for SALE BY AUCTION IN LOTS ON THE PREMISES, WEDNESDAY, 26th JANUARY, 1949, at 11 a.m., the
FOUNDRY PLANT AND EQUIPMENT, including
PNEUMATIC MOULDING MACHINES, by Tabor, Wallwork & Jackman; STEEL and C.I. MOULDING BOXES; 30-CWT. CUPOLA; HAND JIB CRANES; Mansfield Sand; Corebinder Powder; Plumbago; Blacking; VERTICAL SINGLE and 2-CYLINDER AIR COMPRESSORS; 6 in. Centre S.S. and S.C. LATHE; Jones & Shipman Pillar Drill; Petter Oil Engine; Pedestal D.E. Grinder; Flextol Flexible Shaft Grinder; MEADOWS 4-CYLINDER INTERNAL COMBUSTION ENGINE; Circular Saw Bench; Portable Electric Drills; "BOC" WELDING EQUIPMENT; APPROX. 15 TONS PIG IRON and IRON CASTINGS; Aluminium Sheets; Channel and Angle; Shovels; Sieves; Heating Stoves; MIXED IRON and STEEL SCRAP; ELECTRIC MOTORS UP to 5 H.P., 400 VOLTS, 3-PHASE; MORRIS COMMERCIAL VEHICLE.

Catalogues (when ready) may be obtained of MESSRS. EDWARDS & EDWARDS, Incorporated Accountants, 22, HIGH EAST STREET, DORCHESTER, and of
MESSRS. HENRY BUTCHER & CO., Auctioneers, Valuers and Surveyors, of Factories Plant and Equipment, 73, CHANCERY LANE, LONDON, W.C.2. Telephone: HOLBorn 8411 (8 lines).

MACHINERY FOR SALE

FOR SALE.

SECONDHAND 1-ton "Sklenar" Reverberatory Furnace, oil-fired; complete with motor and fan; motor 220 volts d.c. Can be inspected by appointment.
JOHN I. THORNYCROFT & CO., LTD., Woolston Works, Southampton

MISCELLANEOUS.

PAINT Shaking Machine; 2 h.p.; 3/50/400 volts.

Coggan "Rocket" Core Blowing Machine; 15 lbs.

August Borrman Core Blower; size 3A; 3/50/400 volts.

Coleman Abrasive Cutting-off Machine; 20 in. dia. wheel type; 154/CMB; 3/50/400 volts.

Ballard Oil-fired Core Stove; 6 ft. by 2 ft. 7½ in. by 7 ft.; high double doors.

Gas-fired Stove; 5 ft. by 5 ft. by 4 ft.

Electric-heated Oven; 3 ft. by 3 ft. by 3 ft.

Magnetting Machine; 220 volts d.c.

Foundry Ladles; 1- 2½- and 20-ton capacity.

Rockingham Coke-fired Ladle Heaters; 3/50/400 volts.

S. C. BILSBY, A.M.I.C.E., A.M.I.E.E., Crosswells Road, Langley, Near Birmingham Broadwell 1359.

MACHINERY FOR SALE—*Contd.*

FOR SALE.—One Roots Blower, size No. 1; in excellent working condition; recently overhauled.—Apply H. HEWINS, LTD., Port Foundry, Brimscombe, Glos.

GEORGE 600 COHEN'S

DIESEL GENERATING PLANT FOR SALE.

300 kw. General Motors/Allis Chalmers ENGINE; 500 h.p., 1,300 r.p.m., 8-cylinder, vertical; coupled to compound wound Generator, 230 volts d.c.

260 k.v.a. General Motors/Alllis Chalmers ENGINE; 400 h.p., 1,000 r.p.m., 8-cylinder, vertical; coupled to Alternator, 440/3/50.

220 k.v.a. Blackstone/Alpha Harris ENGINE; 260 h.p., 230 r.p.m., 4-cylinder, horizontal, 4-stroke; "V" belt driving Alternator, 400/3/50.

100 kw. National/Delco ENGINE; 150 h.p., 1,200 r.p.m., 8-cylinder, 4-stroke; coupled to compound wound Generator, 240/120 volts d.c., electric start.

75 kw. Crossley/Crompton ENGINE; 110 h.p., 525 r.p.m., vertical, 4-cylinder, 2-stroke; coupled to 110 volts d.c. Generator.

THREE 75 k.v.a. Cummins/Alpha Harris ENGINES; 90 h.p., 1,500 r.p.m., vertical, 6-cylinder, 4-stroke; coupled to new Alternator, 400-440/3/50, 4-wire; export only.

75 kw. Cummins/G.E.C. ENGINE; 120 h.p., 1,500 r.p.m., vertical, 6-cylinder; coupled to Generator, 220 volts d.c., electric start.

70 kw. General Motors/E.E.C. ENGINE; 110 h.p., 1,500 r.p.m., vertical, 6-cylinder; Generator, 200/240 volts d.c., electric start.

TWO 54 kw. Cummins/G.E.C. ENGINES; 90 h.p., 1,500 r.p.m., vertical, 6-cylinder; coupled to Generator, 250 volts d.c., electric start.

TWO 54 kw. Leyland/E.C.C.; 1,750 r.p.m., vertical, 6-cylinder; coupled to Generator, 272 volts d.c.

54 kw. Perkins ENGINE; 1,800 r.p.m., vertical, 6-cylinder; coupled to Generator, 360/285/190 volts d.c., electric start.

FOUR 50 k.v.a. Cummins/Westinghouse ENGINE; 65 h.p., 1,000 r.p.m., vertical, 6-cylinder, 4-stroke; coupled to Alternator, 400/3/50, 4-wire, electric start.

50 kw. Leyland/Harland; 1,750 r.p.m., vertical, 6-cylinder, 4-stroke; coupled to Generator, 230 volts d.c., electric start.

SEVERAL 31.2 k.v.a. Cummins/Westinghouse ENGINES; 37 h.p., 1,000 r.p.m., vertical, 6-cylinder; coupled to Alternator, 400/3/50, 4-wire. Can be supplied mobile, on pneumatic tyred wheels.

Other smaller Sets also available.

GEORGE COHEN
SONS & CO., LTD.,
WOOD LANE, LONDON, W.12
Tel.: Shepherds Bush 2070
and STANNINGLEY, nr. LEEDS
Tel: Pudsey 2241

MACHINERY FOR SALE—*Contd.*

FOR SALE

10-CWT. Morris Electric Lift; cage 4 ft. by 3 ft. by 7 ft. high.
FRANK SALT & CO.,
Tessall Lane, Birmingham. Priory 1828.

FOR SALE.

CUPOLA.—4 ft. dia.; o/a dia.; drop bottom, and with spark arrester; capacity 4 tons per hour; date make 1944; as new.
FRANK SALT & CO., LTD.,
Tessall Lane, Birmingham. Priory 1828.

FOR SALE.

VERTICAL Cross Tube Boiler, 7 ft. by 3 ft. 6 in. dia., 5 h.p., 80 lbs. w.p., by Edwin Danks; 1934; good condition; £125 our works.
FRANK SALT & CO.
144, Tessall Lane, Birmingham, 31.

FOUNDRY PLANT.

CUPOLAS, Fans, Cranes, Hoists, Compressors, Runways, Sand Mills, Pulley Blocks, Conveyors, Steel-framed Buildings.
FRANK SALT & CO., LTD.,
Tessall Lane, Birmingham. Priory 1828.

FOR SALE

5 TONS Nickel Pig for Sale; analysis: T.C, 2.4; Mn, .8; Si. 2.0; P, .3; S, .1; nickel, 8.09. Also Zimmerman Automatic Jolt Squeeze Rollover Moulding Machine; can be seen working.—Best offers, MR. FRENCH, L.E.C. Factory, Bognor. 'Phone 2201.

ALBION WORKS

"OLIVER" Motor-driven PLANISHING HAMMER; 36 in. gap, with holes; driven through three laminated ropes by 2 h.p. Squirrel-cage Motor, 350/3/50.

15-cwt. "Massey" Self-contained PNEUMATIC HAMMER, of the guided type, with 30 h.p. Motor.

40-cwt., "Massey," "Clear Space," Self-contained PNEUMATIC HAMMER; single blow type; 3 ft. 6 in. stroke; driven through vee belts by 180 h.p. S.R. Motor, 400/3/50, with "Ellison" Starter.

3-cwt. capacity, Double Leg, Overhung STEAM HAMMER, of the guided type; approx. 15 in. stroke, with anvil and bedplate.

New Portable Petrol-driven BELT CONVEYORS; 25-ft. centres; 16 in. wide belt; delivery from stock.

15-cwt., "Wharton," 2-motor, Hoisting and Travelling ELECTRIC BLOCKS; 440/3/50 supply, for running on 5 in. R.S.J.

THOS W. WARD LTD.
ALBION WORKS : SHEFFIELD
Phone: 24311 'Grams: "Forward."
Remember - Wards might have it!

MACHINERY FOR SALE— *Contd.*

FORGE BLOWERS in Stock for d.c. or a.c. Mains, at £13 10s. and £15 16s. each respectively.—UNIVERSAL ELECTRICAL, 221, City Road, London, E.C.1.

TILTING Rotary Furnace wanted; 5 to 10 tons capacity; Brackelsburg or similar type.—Full details to Box 136, FOUNDRY TRADE JOURNAL.

FOR SALE.

COLEMAN Core Blowing Machine; type R.2.

McNab Hinge Type Shockless Jolt Ram Rollover and Pattern Drawing Machine.

A. & S. No. 2 Vertical Milling Machine; table 36 in. by 10 in.; motorised, 400/3/50; first-class tool.

Ditto, No. 4; table 60 in. by 15 in.

One 14 in., double ended, motorised 400/3/50, Heavy Duty Grinding Machine; ideal foundry Machine.

One ditto; 20 in.

One 5-ton Ladle; as new.

One 1-cwt. Land Mill.

Four Zimmerman Moulding Machines.

Three Pulford & Gray Pot Furnaces; 100 lbs.; complete with motor and fan, 400/3/50.

One Mould Drying Machine, by Harry Coggon, Halifax.

Two 4 ft. dia. Cupolas.

FRANK SALT & CO., LTD.,
Tessall Lane, Birmingham. Priory 1820.

FOR SALE.

CUPOLA; 3 ft. dia. shell; 3 tons per hr. output, with blowing fan, etc.

Sand Mill; 4 ft. 6 in. stationary pan; motorised, 3/50/400 volts; 10 h.p.

Core Stove; 6 ft. by 5 ft. by 4 ft. 6 in.; double cased, gas-fired.

Box 140, FOUNDRY TRADE JOURNAL.

FOR SALE

MOULDING MACHINES.

PNEULEC Herman Jolt Rollover; 26 in. by 48 in.; 1,500 lbs. capacity.

Zimmermann type Jolt Squeeze Hand Turnover; 24 in. by 27 in.

Coleman Davenport Jolt Rollover; 4 ft. 9 in. by 2 ft. by 1,000 lbs. capacity.

S. C. BILSBY.
A.M.I.C.E., A.M.I.E.E.,
Crosswells Road, Langley, Near Birmingham.
Broadwell 1359

FOR SALE.

ONE Multi-Steelyard Weighbridge (maker, Ashworth Ross & Co.).

One Crane Magnet; 3 ft. 6 in. dia.; 230 volts (by Krammer, Witton).

One Crane Magnet; 4 ft. dia.; 230 volts (by Rapid, Birmingham).

One "Avery" Auto-Precision Weighing Machine; fitted with railway lines for weighing railing trucks if necessary (30 tons by 28 lbs.).

Apply:—
HALE & HALE (TIPTON), LTD.,
DUDLEY PORT, TIPTON, STAFFS.

MACHINERY FOR SALE—*Contd.*

FOR SALE.

CORE-DRYING Stove and Furnace, by Traykor.

Pneulic Royer No. 1.

Polford Sand Mixer.

Jackman Sand Mill and Mixer.

Three 45-lb. single hand Shank Ladles.

Three 1-cwt. double hand Shank Ladles.

One 20-cwt. Geared Ladle.

All new.

One No. 4 Roper Economic Cupola, with lining; approximately 3 tons an hour; secondhand.

One 5-ton, 30 ft. span, Overhead Crane, by John Smith, of Keighley; new 1941; secondhand.

HENRY MILNES, LTD.,
Machine Tool Works,
Ingleby Street,
Bradford, Yorks.
'Phone: Bradford 41301.

MISCELLANEOUS.

FORDATH Sand Mixer; type "B"; 10-cwt. capacity.

Pneulec type P.M. Oil Sand Mixer; 160 lbs.

Holmes type VSK. Sand Mixer and Aerator.

Coleman "Prosama" Sand Slinger.

3 ft. 6 in. dia. Sand Mill; under-driven revolving pan.

All above for 3/50/400 volts.

S. C. BILSBY, A.M.I.C.E., A.M.I.E.E.,
Crosswells Road, Langley, Near Birmingham.
Broadwell 1359.

DELIVERY EX STOCK

New shot blast cabinets complete with Dust Extractors, etc., size 5ft. × 3ft.

Also new 8ft. cube Room Plants Low prices.

Illustrated catalogues free on request from:—

ELECTROGENERATORS
LTD.
14 AUSTRALIA RD., SLOUGH
Telephone: SLOUGH 22877

BUY FROM US AND SAVE MONEY

FOR SALE.

2 5-ton Collins Ladles; bottom and lip pour.

2 Holmes Reyrolle, a.c./d.c., single operator, Welding Sets; 450 amp.; 440 volts, 50 cycles, 3-phase, input;; 80 volts d.c. output.

50 Sets M.S. Box Parts (Copes and Drags); 20 in. by 20 in. inside by 9 in. deep; pin lugs and clamping bars.

137 Clamps for above.

5 Sets M.S. Box Parts (Copes and Drags); 17 in. by 31 in. inside by 5 in. deep; pin lugs and clamping bars.

94 C.I. Core Plates; machine faced, ribbed back; 17¼ in. by 14 in. by ¼ in.

27 C.I. Core Plates; machine faced, ribbed back; 19 in. by 14 in. by ¼ in.

Box 106, FOUNDRY TRADE JOURNAL.

MACHINERY FOR SALE—*Contd.*

ROTOIL Sand Mixer; large size; £175.

Spermolin Core Mixer; £35.

Brand new Cupola; details on request.

New Dust Collector; £55.

Several new Core Stoves.

Fifty brand new, Keith Blackman, a.c. motor-driven, Cupola Blowers.

Several new Broom & Wade Compressors.

Full details on request.

ELECTROGENERATORS LTD.,
Australia Road,
Slough.

Telephone: Slough 22877.

FOR SALE.—Band Saw, 24 in., with motor, almost new, 75 lb.—F. BULLETT & Co., High Street, West Molesey, Surrey. 'Phone: MOL. 1573.

AND MIXERS and DISINTEGRATORS for Foundry and Quarry; capacities from 10 cwts. to 10 tons per hr. —W. & A. E. BERALEY (MACHINERY), LTD., Station Works, Ecclesfield, Sheffield.

CAPACITY WANTED

GREY Iron Foundry capacity required for large quantity light repetition castings.—Box 128, FOUNDRY TRADE JOURNAL.

REDUNDANT Melting Furnaces for immediate delivery; Bale-outs, Lift-outs; coke-, gas- and oil-fired; various sizes. Also Lift-out Crucible Furnaces, coke-fired.—THE FURNACE EXCHANGE, New Road, Newhaven, Sussex. Newhaven 414.

CAPACITY AVAILABLE

ALUMINIUM Capacity for Gravity and Pressure Casting; large modern plant. Available ex-stock 50,000 Cast Aluminium Wheels, with or without tyres; 6 in. dia.—Box 698, FOUNDRY TRADE JOURNAL.

NON-FERROUS FOUNDRY, capacity available, including sand blasting; competition prices quoted.—ALBUTT, SON & JACKSON, Valve Makers and Brass Founders, Greenmont Works, Halifax.

IRON Foundry Capacity available for small and large machine moulded work in moderate quantities and also on the jobbing floor.—Apply MANLOVE, ALLIOTT & Co., LTD., Bloomsgrove Works, Nottingham.

IMMEDIATE capacity available for Non-ferrous Castings: Brass, Gunmetal, Phosphor Bronzes, Aluminium Bronzes, and all types of Aluminium Alloys.

Keen prices. Speedy delivery of quality castings.—EXCEL ALLOYS (Telephone: Gravesend 2509), Non-ferrous Founders, Engineers, Grove Road, Northfleet, Kent.

THE PATTERN EQUIPMENT CO., Mount Avenue, Prospect Road, Leicester, have immediate capacity for all types of Wood and Metal Patterns; keenest quotations and delivery by return. 'Phone 23773.

CAPACITY AVAILABLE—*Contd.*

IRON CASTINGS.—Capacity available repetition foundry specialising in Grey and High Duty Castings to controlled analysis; adequate pattern making capacity available if required.—Box 116, FOUNDRY TRADE JOURNAL.

WHEN placing your future orders for Aluminium Castings why not consult SEYMOURS' "CASTWELL" FOUNDRY?; Derby's foremost Aluminium Founders; keen prices for quantities.—Write and submit your drawings to LITCHURCH LANE, DERBY. 'Phone 3234.

MISCELLANEOUS

ARE your Machines properly guarded against Accident? We can give a quick delivery of Guards for foundry machines and for all other foundry requirements in sheet metal.—Send details of your requirements to THE GLENMOOR ENGINEERING CO., Eyres Avenue, Stanningley Road, Leeds, 12.

INDUSTRIAL and Extraction Specialists for all types of Dust and Fume Extraction, Cyclones, Bag Settlers, Spray Boothes, Sand Blasters, Ovens, Steel Chimneys, etc.—Apply BIRMINGHAM INDUSTRIAL FANS, LTD., Salford Bridge, Birmingham. 'Phone: East 0036.

FOR your requirements of Southport Sea Sand for Core Castings; quick deliveries by road and rail.—JOHN LIVESEY (AINSDALE), LTD., 8, Leamington Road, Ainsdale, near Southport. Tel.: Ainsdale 7489.

FOR SALE.

NEW STIRLING BOXES.
Two 3 ft. 3 in. sq. by 27 in.
Two 3 ft. 3 in. sq. by 20 in.
Two 3 ft. 3 in. sq. by 5 in.
HENRY WILSON & CO., LTD.,
Cornhill Works, Liverpool.

FOR SALE.—Domestic Scale Patterns, mounted on moulding plates; outstanding designs; also large quantity of the above painted and drilled ready for assembling, fittings included; all cast in aluminium alloy (DTD. 424); reason for disposal facilities only for casting.—Box 974, FOUNDRY TRADE JOURNAL.

MISCELLANEOUS—*Contd.*

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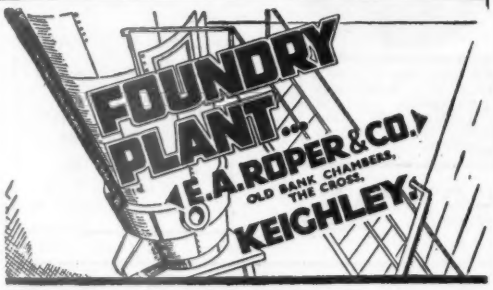

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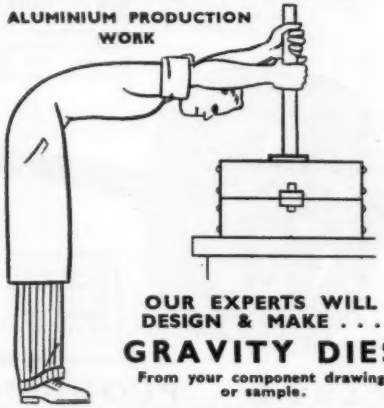

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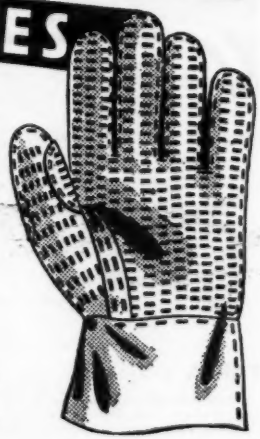

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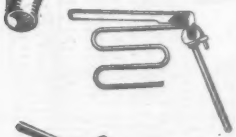

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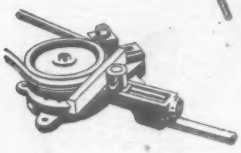

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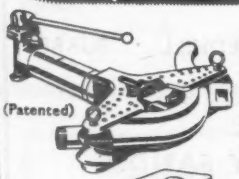

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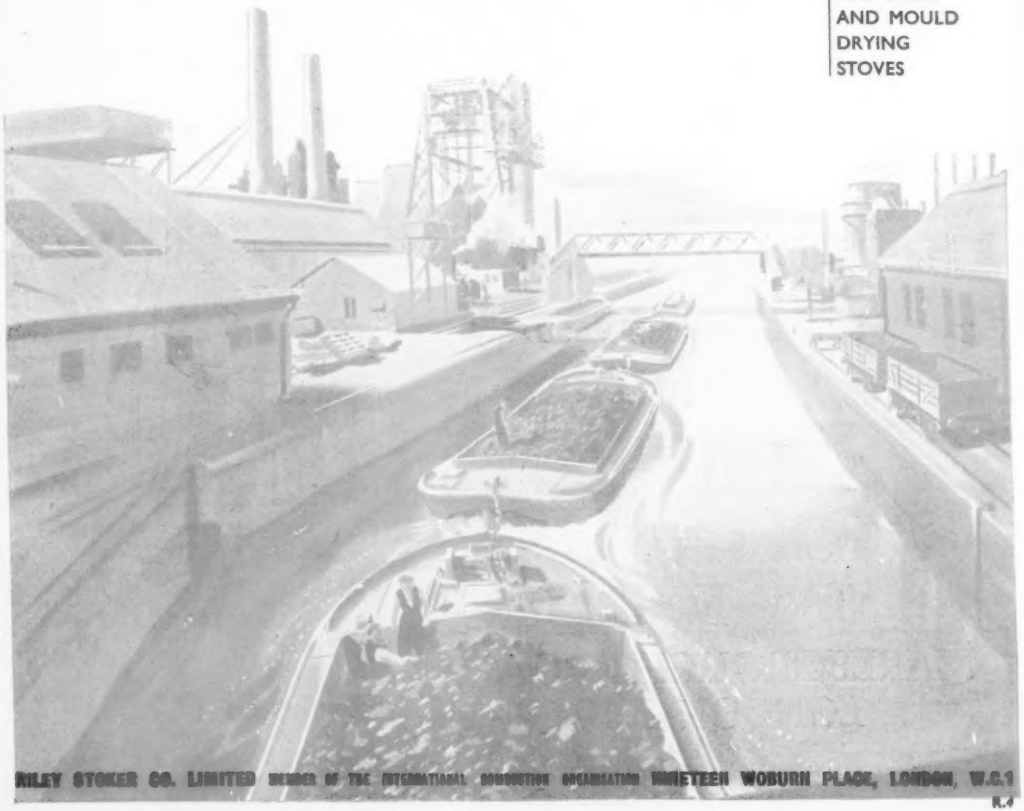

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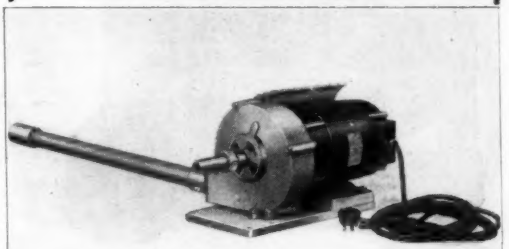

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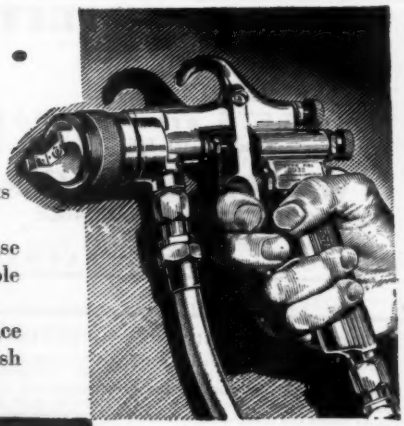

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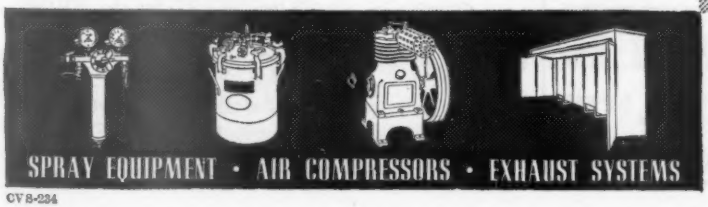

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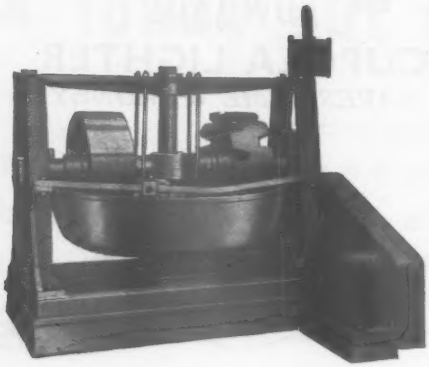

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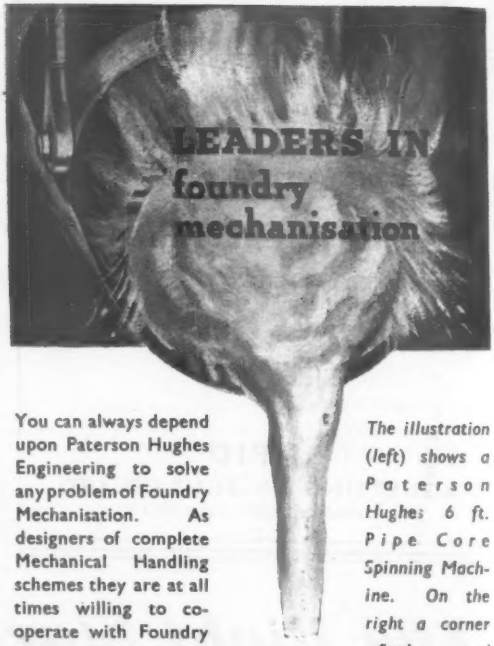

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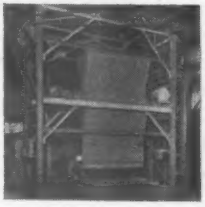

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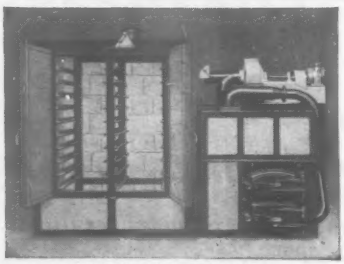
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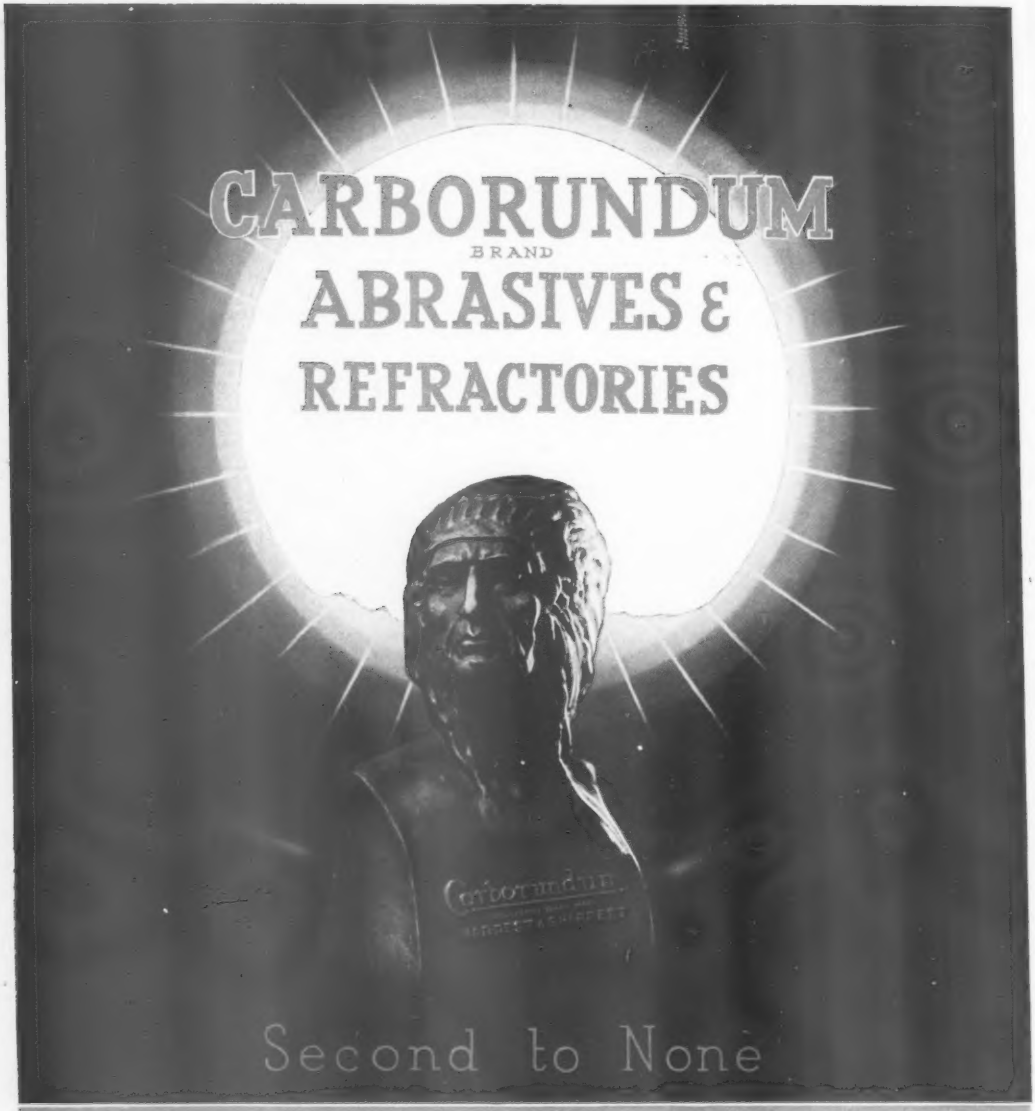

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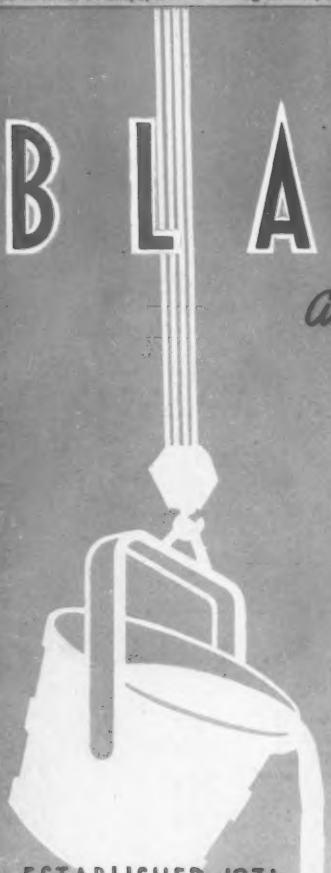

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